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Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, CA 92132-5190

CONTRACT NO. N44255-95-D-6030
DO NO. 0095

FINAL

EXPLOSIVES SAFETY REMEDIATION PLAN

Revision 0
May 17, 2002

ORDNANCE AND EXPLOSIVES WASTE CHARACTERIZATION, TIME-CRITICAL REMOVAL ACTION, AND GEOTECHNICAL AND SEISMIC EVALUATIONS AT INSTALLATION RESTORATION SITE 2 ALAMEDA POINT ALAMEDA, CALIFORNIA

DCN: FWSD-RACII-02-0247

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Neil Hart, Program Manager

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RESPONSE TO COMMENTS
DRAFT FINAL EXPLOSIVE SAFETY REMEDIATION PLAN
FEBRUARY 8, 2002
ORDNANCE AND EXPLOSIVES WASTE CHARACTERIZATION,
TIME-CRITICAL REMOVAL ACTION,
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Comments by: Naval Ordnance Safety and Security Agency/ Ordnance Environmental Support Office Received February 21, 2002	Responses by: Foster Wheeler Environmental Corporation 1940 E. Deere Avenue, Suite 200 Santa Ana, CA 92705
General Comments on Explosives Safety Remediation Plan	
Comment 1. The presentation conforms well with Table 2-2, "Outline of an Explosive Safety Remediation Plan", in NAVSEA OP-5. Let's see more like this one.	**Response 1.** Comment noted.
Comment 2. The executive summary is more like part of the General Description section. It's not narrowed down enough to just the OEW investigation and removal action. It's not an executive summary. [NO ACTION REQUIRED]	**Response 2.** Comment noted.
Specific Comments on Explosives Safety Remediation Plan	
Comment 1. Figure 2-2 shows Magazine 354 with an ESQD arc, yet the other maps and text discuss using 353. [NO ACTION REQUIRED] Note regarding magazine use: No official letter is on file that cancels the siting of the magazines at Alameda. Therefore, Magazine 353 or 354 may be used for this project without additional approval documentation.	**Response 1.** Comment noted. The figure will be amended to reflect the magazine that will be used.
Comment 2. Section 3.3, Frost Line. A related question would be: are there any special erosional issues that could lead to exposure of ordnance after clearance to the selected depth? In this case, I assume not (flat terrain). [NO ACTION REQUIRED]	**Response 2.** Comment noted.

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Comment 3. Section 3.4.2, TCRA Excavation. It's not clear how a 12-inch assessment/ clearance depth has been selected. Para. 1.2, "Planned Activities", says that this is the "required remediation depth for land used as a wildlife refuge". That is incorrect. One foot is the assessment depth for interim planning purposes when no other information is available. (DoD 6055.9-STD, para C12.3.4.5.). Is there an assumption that the 20MM rounds were dumped on the surface, so there's no need to go deeper than one foot? Is there an agreement from the future stakeholders that there will be limited or no public access to the site? [PLEASE CLARIFY]	**Response 3.** Comment noted. The end use of IR Site 2 is known. When remediation measures have been completed on the site, the land will be transferred to the USFWS and will become the Alameda National Wildlife Refuge. A surface characterization sweep of the entire site will be completed. Land use controls are planned for the site that will prohibit construction. Access to the site will be very restricted, and the site is fenced to prevent unauthorized entry. For these reasons, the interim planning default depth of 1 foot was chosen as the recommended excavation depth for the Possible OEW Burial Site. While it does not eliminate the possibility that residual OE/OEW may exist at depths greater than 1 foot in the site, it does reduce the risk of human encounters with OE/OEW to a level acceptable to the regulators and the stakeholders. This will be included in the ESRP.
Comment 4. Although the Table in OP-5 describing the Explosive Safety Remediation Plan doesn't require a risk assessment, the table does not cover all aspects of explosives safety. Contracts issued for operations occurring aboard a DON activity must comply with all the requirements of NAVSEA OP-5. (OPNAVINST 8020.14, Ch. 15). This is an attended screening operation involving potentially hazardous munitions. A risk assessment or hazards evaluation of some sort should have been done. The assessment would consider the maximum credible event (MCE). What is the MCE for the excavation and screening operation? Explosion of 32 grams of propellant in a 20MM TP round? Detonation of the designated most probable munition (a 20MM HE round)?	**Response 4.** Comment noted. Based on the results of earlier surveys and an Emergency Removal Action (ERA), the 20-mm HEI round with a single-action point detonating fuze was identified as the Most Probable Munition (MPM). The risks associated with the MPM were considered when developing the project Health and Safety Plan, Work Plan, and the Standard Operating Procedures for OE/OEW. They included: • Maximum Fragment Throw Range - 320 feet • Maximum Credible Event – the detonation of 165 grains (.37 oz) of explosives and 20 grains of incendiary mixture in a single round (representative for 20-mm HEI rounds of the M563A3/A4 variety)

	• Methods of initiation – actions that would function a fired, single-action point detonating fuze with arming and firing features similar to the M503A3 nose fuze (typical for 20-mm HEI rounds) – striking, dropping, rough handling, and static electricity • Transportation and storage • The probability of occurrence and possible quantities of the MPM that could be encountered (results of earlier ERA divided by the total acreage of the project) • Barricades, personnel protective equipment, exclusion zones The information listed above was used to prepare a risk assessment in the Action Memorandum for a CERCLA Time-Critical Removal Action (FWENC, 2002). The risk assessment was completed following procedures found in the Risk Assessment Procedures for Ordnance and Explosives Sites worksheet, found in the U.S. Army Corps of Engineers' pamphlet on Ordnance and Explosives Response (EP 1110-1-18). Risk evaluation results indicated that the hazard severity category was "critical" and the hazard probability was "probable". The combination of these two factors resulted in a Risk Assessment Code (RAC) 2 rating. The RAC 2 rating and information contained in the public record demonstrated that conditions at the site warranted the conduct of the TCRA. This will be included in the text of the ESRP.

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Comment 5. Did the contractor evaluate operator protection requirements? Are the contractor's operators protected from potential blast overpressures, hazardous fragments, and thermal effects? What's the probability of an accidental explosion, or an accidental flash fire? Is it above an acceptable risk level (OP-5 para. 7-7.4.1)? What does the contractor know about the initiation sensitivity of 20MM rounds, or potential initiation sources within the equipment? If hazards analysis (7-7.3) shows that risks are too high, protection for personnel must be capable of limiting incident blast overpressure to 2.3 psi, fragments to energies of less than 58 ft-lb, and thermal fluxes to 0.3 calories per square centimeter per second (7-7.4.1). Are operational shields required (8-3.1.4)?	**Response 5.** Comment noted. The Work Plan, Health and Safety Plan, and Standard Operating Procedures (SOPs) developed for this project did evaluate protection requirements for site personnel based on the selection of the MPM, which was determined to be a fired 20-mm HEI round with a single-action point detonating nose fuze. Procedures for the surface characterization and Possible OEW Burial Site excavation were developed, and specialized equipment was chosen to reduce the risk of accidentally encountering the MPM. Site personnel are all EOD school graduates; the Senior UXO Supervisor has over 16 years of EOD experience, and the project UXO Coordinator is a recently retired Naval EOD officer with over 26 years in the program. Thorough research on the explosive weight/type, fuze firing sequence, fuze sensitivity, hazards and safety precautions for the MPM was completed before project plans (Work/Health and Safety/SOPs) were written. (Ordnance-specific publications used to estimate risk levels and hazards included OP 1664, ORD Data II, TM-9-1900/1901/1901B, TM 9-2200, TM 43-001-28, among others) Based on the site history, earlier survey results, planned procedural and protective measures, and the MPM and the hazards analysis, it was determined that the probability of an accidental explosion would be low, the risk level would be acceptable, and the measures planned for personnel safety are adequate. Operational shields will be used during soil sifting and projectile demilitarization activities. This information will be included in the ESRP.

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Comment 6. This project isn't the only one proceeding without a formal risk assessment. I bring up these questions because I'm concerned that eventually we're going to have an explosion.

Do we have mission creep here? We started screening operations in the San Diego dredge spoils project, with ordnance, unfuzed, dumped-overboard in port: relatively nonhazardous. But we did a hazards assessment: "Disposal of Pier 3 Dredged Material and the Impact of Small Amounts of Munitions in the Sediment", "Estimation Of Maximum Allowable Density Of Rounds To Limit Risk Of Hitting A Round", etc. And NOSSA provided an approval in accordance with OP-5 paragraph 7-7.4.1 in Memorandum 8020 Ser N7112/185 dated 19 NOV 1999, "Methodology for Characterization of Dredged Material".

Next, NAVFAC proceeded with a screening operation for ordnance in a landfill at Seal Beach. No hazards analysis provided, no NOSSA approval. If I remember correctly, the MPM was a 60MM mortar round, unfired.

Spurred on by their success, they now propose to screen at Alameda for 20MM rounds. If a 20MM HEI round shows up, it could be more hazardous than things they've been sifting before, but I don't know for sure. There's no hazards analysis. We haven't required site approvals for this operation at San Diego or at Seal Beach. We haven't visited the sites. There is no government representative present at the jobsite.

[If a hazards assessment of some sort was done at any point for this project, such as part of an Engineering Evaluation or Action Memorandum process, please provide.]

Response 6. Comment noted. FWENC requires a hazard assessment during the planning stages of every project. The assessment is a part of the Task Initiation Procedure (TIP) that includes identifying significant risks by:

- Identifying the probability of occurrence (likelihood)
- Identifying the scale of the risk (local, regional)
- Identifying the severity of the risk (injury, death)
- Identifying the duration of the risk

The MPM was determined and thorough research was conducted to identify all hazards associated with it. Procedures and equipment were selected to reduce the risk of accidentally encountering the MPM during characterization and excavation activities, or accidentally detonating it, if found. Personal protective equipment, exclusion zones, markers, notifications, barricades, and fencing were all incorporated into the Work Plan to mitigate hazards associated with the project.

A risk assessment was included in the Action Memorandum for a CERCLA Time-Critical Removal Action (FWENC, 2002). The risk assessment was completed following procedures found in the Risk Assessment Procedures for Ordnance and Explosives Sites worksheet, found in the U.S. Army Corps of Engineers' pamphlet on Ordnance and Explosives Response (EP 1110-1-18).

	Risk evaluation results indicated that the hazard severity category was "critical" and the hazard probability was "probable". The combination of these two factors and information contained in the public record demonstrated that conditions at the site warranted the conduct of the TCRA. The probability of contacting live ordnance is considered remote, but cannot be ruled out. Therefore, the explosive risks for ordnance items in the Possible OEW Burial Site are considered to present an imminent and/or substantial endangerment.
Comment 7. Comment on Section 3.4.2: Point-search ("Mag and Flag") techniques will be used. This TCRA will result in a permanent record which does not include sensor data that is digitally recorded and geo-referenced. For example there will be no geophysical map of the cleared area, showing any remaining anomalies or lack thereof, which can be added to the Administrative Record. This is not optimal, but since this is a small site perhaps you can skip it. Be advised however that the Sep 2001 DERP Management Guidance states: **Para 19.3.** For responses to address military munitions (i.e., UXO or WMM), Components shall have a permanent record of the data gathered to characterize a site and a clear audit trail of pertinent data analysis and resulting decisions and actions. To the maximum extent practicable, the permanent record shall include sensor data that is digitally recorded and geo-referenced. Exceptions where digitally recording and geo-referencing are impractical shall be approved by an appropriately designated member of the Senior Executive Service, a General Officer, or a Flag Officer. These data shall be included in the Administrative Record. **[PLEASE RESPOND]**	**Response 7.** Comments noted. Site grid staking for UXO characterization and burial site excavation were surveyed based on horizontal and vertical control (benchmark) established by Kiser, Savio, & Rei (KSR) (FWENC Surveyor), located at Main and Atlantic. The vertical datum was oriented to California coordinate system National Geodetic Vertical Datum 29 (NGVD29) and horizontal survey datum to North American Datum 83 (NAD83). The grids were superimposed on a computer-assisted drafting (CAD) drawing of NAS Alameda. The exact location of items found during the characterization and excavation will be geo-referenced by northing and easting distances from the southwest grid stake in the grid found. The locations will be plotted on the CAD site map and will be incorporated into the geographic information system (GIS) for NAS Alameda. Digital photographs will be taken of every item found during the characterization and excavation. The photographs will be geo-referenced to the appropriate grid and recorded in the project photograph log. The photographs and the photograph log will be provided to the DON at the end of the project. This information will be included in the text of the ESRP.

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Comment 8. Section 3.4.4, OE/OEW Disposition. The paragraph states that "California regulations (California EPA and the DTSC) prohibit open burn or open detonation as a means of treating OE/OEW on California sites"... This is incorrect. OB/OD may be used for emergency response. OB/OD may be used for disposal at a RCRA-permitted facility. OB/OD may be used for destruction of waste on-site at a CERCLA cleanup without a RCRA permit, subject to engineering controls, conformance with substantive requirements, review of ARARs etc. The paragraph further states that "the regulations also prohibit California military bases from accepting off-site waste military munitions for treatment". This is incorrect. Each military activity has stipulations in its existing hazardous waste treatment permits as to receipt of off site waste. Many DoD facilities have chosen not to receive off site waste but this was not imposed by California. [NO ACTION REQUIRED]	**Response 8.** Comment noted.
Comment 9. Section 3.4.4, OE/OEW Disposition. There is a mention of developing a DoT-compliant package for each OE item which will be shipped, etc. Shipping waste OE via common carrier in DoT compliant packaging is a relatively new phenomenon. For 20MM TP rounds, probability of success is good. PHS&T has already developed document PHST-11326, "Shipping and packaging condition for unexploded ordnance (UXO) 20MM Cartridge and 20MM parts". Additionally, Memorandum 5600 Ser 715/0008 dtd 08 JAN 2002, "Container Certification", includes Enclosure (4), Certificate of Equivalency, NA-01-507, Recovered 20MM Ammunition in M548 Shipping and Storage Container", and Enclosure (8), CoE NA-01-510 "Recovered 20MM Nose in" same as above. These documents have been provided to FWENC by NOSSA previously in support of this project.	**Response 9.** Comment noted.

Comment 9. (Continued). In addition to the above documents, FOSTER WHEELER ENVIRONMENTAL CORPORATION Memorandum dated 21 September, 2001 to Commander Crane Army Ammunition Activity SMACN-EDS (Mr. Tim Adams) Subject: Request for Quotation, and a memorandum of the same date to Commanding Officer Naval Surface Warfare Center Indian Head Division Detachment Earle (Code 715RD) Subject: Request for Quotation contain much information on the transportation and disposition plans for the 20MM rounds which is not included in the ESS. FWENC has done a good job of preparing for the eventuality of shipping recovered ordnance, and these supporting documents should have been included in the ESRP as an appendix. [NO ACTION REQUIRED]	
CAUTION: Shipment of items over 20MM nominal caliber, for which no packaging has previously been developed (See PHST Memo referenced above for existing list), IS NOT *FAIT ACCOMPLI.* There are many questions of safe to ship certification and acceptance of shipment by other than EOD of such items. In addition to obtaining CoE and packaging, the U.N. Section 4 Tests of TBD 700-2 (thermal stability and 12 meter drop tests) may be required rather than a qualitative evaluation. Contact NOSSA N51 (J.Dow) for details.	**Caution noted:** FWENC will contact NOSSA prior to shipping any ordnance item to a disposal site. Additionally, if the MPM items are discovered (20-mm ammunition with inert projectiles) and deemed safe to ship, NOSSA will be contacted to verify that Certificate of Equivalency NA-01-507 and PHST Drawing 11326 are still valid and may be used for shipping the items.

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ATTACHMENTS

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ABBREVIATIONS AND ACRONYMS

AO	abandoned ordnance
BIP	blow-in-place
CAD	computer-assisted drafting
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CL	confidence Level
DDESB	Department of Defense Explosive Safety Board
DoD	Department of Defense
DON	Department of the Navy
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
E&E	Ecology and Environment, Inc.
EO	Expended Ordnance
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ESC	Explosive Shipment Certification
ESRP	Explosives Safety Remediation Plan
EZ	exclusion zone
FWENC	Foster Wheeler Environmental Corporation
GIS	geographic information system
HEI	high explosive incendiary
IHC	Interim Hazard Classification
IR	Installation Restoration
KSR	Kister, Savio, & Rei
MPM	most probable munition
NAD83	North America Datum 83
NAS	Naval Air Station
NAVSEA	Naval Sea Systems Command
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEW	net explosive weight

ABBREVIATIONS AND ACRONYMS
(Continued)

NGVD29	National Geodetic Vertical Datum 29
NOSSA	Naval Ordnance Safety and Security Activity
OB/OD	open burn or open detonation
OE	Ordnance and Explosives
OEW	ordnance and explosive waste
OU	Operable Unit
PCB	polychlorinated biphenyl
PD	probability of detection
PHST	Packing, Handling, Storage, and Transportation Center
QA	quality assurance
QC	quality control
Q-D	quantity distance
RAC	Risk Assessment Code
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board
SEP	Search Effectiveness Probability
SHSS	Site Health and Safety Specialist
SOP-1	Standard Operating Procedure 1
SSPORTS	Supervisor of Shipbuilding Conversion and Repair
SUXOS	Senior Unexploded Ordnance Supervisor
SWDIV	Southwest Division Naval Facilities Engineering Command
TCRA	Time-Critical Removal Action
TP	target practice
TtEMI	Tetra Tech EM Inc.
TTLC	Total Threshold Limit Concentration
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance

DEFINITIONS

Abandoned ordnance (AO)—Armed or unarmed ordnance and that was disposed of by abandonment, including land or water dumping or burial.

Anomaly—An object or location that is shown on a "dig map" as a possible ordnance or explosive object resulting from interpretation of the geophysical survey data.

Contractor Field Office—A designated location staffed by personnel to relay and control all communications/activities of field personnel and other units.

Exclusion zone (EZ)—Areas where contamination (hazards) is known or likely to be present or areas that, because of activity, have the potential to cause harm to personnel.

Expended ordnance (EO)—Ordnance that has functioned as designed, leaving the shell or container behind. This shell or container may or may not contain explosive/pyrotechnic/toxic residue. This material would not be considered inert and could not be salvaged as scrap without appropriate visual inspection, sampling, and/or treatment.

Explosive ordnance disposal (EOD) Personnel—Active-duty military personnel who have graduated from the U.S. Naval School for EOD, Eglin Air Force Base, Florida, the U.S. Bomb Disposal School, Aberdeen, Maryland, or graduates of the EOD Assistant Course, Redstone Arsenal, Alabama, and are currently assigned to a military facility or activity.

Inert ordnance—Ordnance that never contained explosives (that is, munitions manufactured as classroom training aids), or ordnance that has had all explosive components removed and has been certified as safe.

Intrusive Investigation—Excavating for suspected unexploded ordnance (UXO) items or for plotted anomalies. Excavation will be by hand or will be done using heavy equipment as deemed appropriate.

Non-Intrusive Investigation—Locating and investigating UXO on the surface of the ground where excavation is not required.

Non-Ordnance and explosive metal debris—Metal debris recovered during operations which is not ordnance related, such as metal rebar, angle iron, sheet metal and bar stock, and so forth.

Ordnance and explosives (OE)—Bombs, guided and ballistic missiles, artillery, mortars, rocket ammunition, small arms ammunition, antipersonnel and antitank mines, demolition charges, pyrotechnics, grenades, sea mines, torpedoes, depth charges, containerized and non-containerized high explosives and propellants, depleted uranium rounds, military chemical agents, and all similar components related to munitions that were designed to cause damage to personnel or material through explosive force, incendiary action, or toxic effects. Non-containerized high explosives, propellants, or soils contaminated with explosive constituents are

considered explosives if the concentration of explosive material is 10 percent or higher by weight.

Ordnance and explosive metal debris—Ordnance materials which have not been in direct contact with the energetic materials of the ordnance, such as bomb fins, grenade spoons, shipping containers, and so forth.

Ordnance and explosive waste (OEW)—Ordnance materials which have been in direct contact with the energetic materials of the ordnance, such as expended rocket motors, shell casings, warhead fragments, powder containers, and so forth. These shells or containers may or may not contain explosive, pyrotechnic, or toxic residues. Materials will not be considered inert, and will not be salvaged as scrap, without appropriate visual inspection, sampling, and/or treatment.

Practice ordnance—Munitions that demonstrate characteristics similar to their high explosive counterparts and that may or may not contain pyrotechnic, explosive, or chemical, titanium tetrachloride) spotting charges.

Unexploded ordnance (UXO)—Military munitions that have been primed, fused, armed, or otherwise prepared for action that have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material, and that remain unexploded either by malfunction, design, or any other cause. This term is used many times in place of OE as an all-encompassing term.

UXO personnel—Contractor personnel who have completed specialized EOD military or U.S. Department of Defense (DoD)-approved civilian training in EOD methods. Various grades and contract positions are established based on skills and experience.

EXECUTIVE SUMMARY

This Explosives Safety Remediation Plan (ESRP) has been prepared for ordnance and explosives (OE), abandoned ordnance (AO), and ordnance and explosives waste (OEW) characterization and the Time-Critical Removal Action (TCRA) at Installation Restoration (IR) Site 2, Operable Unit (OU)-4A of former Naval Air Station (NAS) Alameda, Alameda Point, Alameda, California. The U.S. Department of the Navy (DON), Southwest Division Naval Facilities Engineering Command (SWDIV), directs these actions in accordance with requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Foster Wheeler Environmental Corporation (FWENC), as the general contractor, is responsible for conducting this work prior to the remedial investigation that will be performed. The investigation/evaluation proposed in this document does not address chemical contamination in soil, sediment, or groundwater. The DON has initiated the planned investigation at IR Site 2 to substantially eliminate, prevent, or abate any potential hazards associated with OE/AO/OEW items. The OE that may be encountered include AO (buried or dumped), unexploded ordnance (UXO) (fused and fired), or OEW (OE materials that have been in contact with energetic materials). OE debris and scrap OE materials that have not been in contact with energetic material may also be found. It is anticipated that no further OE-related action will be required at this site after completing the planned activities.

IR Site 2 is located on the western coastline of Alameda Point, Alameda, California, and includes the West Beach Landfill (the landfill), the West Beach Landfill Wetland (the wetland), and the associated interior and coastal margins. The landfill is sited on approximately 77 acres in the extreme southwestern end of Alameda Point. It was used as the main disposal area for the former NAS Alameda from approximately 1952 through 1978. An estimated 1.6 million tons of waste were deposited there [Ecology and Environment, Inc. (E&E), 1983]. The wastes included municipal solid waste, waste chemical drums (contents unknown), solvents, oily waste and sludge, paint waste, plating wastes, industrial strippers and cleaners, acids, mercury, polychlorinated biphenyl (PCB)-containing liquids, batteries, low-level radiological waste from radium dials and dial painting, scrap metal, inert ordnance, asbestos, several pesticides (solid and liquid), tear gas agent, biological waste from the Oak Knoll Naval Hospital, creosote, dredge spoils, waste medicines, and reagents (E&E, 1983). OE may have also been deposited in the 2.5-acre (approximate) Possible OEW Burial Site located in the southern part of the landfill. A seawall was constructed along the southern and western edges of the site. A 36-inch culvert was installed in the seawall to hydraulically connect the San Francisco Bay to waters within the seawall. A substantial (10- to 15-foot) dike was installed around the perimeter of the site when disposal operations ceased.

The wetlands cover about 30 acres and are bounded by the landfill to the north and east and by the coastal margin adjacent to the San Francisco Bay on the south and west. The wetlands contain two perennial ponds. The northern pond is connected to the bay by the culvert and the southern pond was created by the removal of dredged materials for use as landfill cover. Fresh water has since filled the excavation area and created the pond. The only material known to have been deposited in the wetland is scrap metal (E&E, 1983).

The coastal margin is the thin strip of land between the landfill or wetland and the bay. It acts as a buffer for the landfill and the wetland and is composed of the perimeter dike and a rip-rap seawall. Materials in the coastal margin differ from those in the landfill and wetlands. The interior margin is the area of IR Site 2 that lies outside the perimeter dike and wetlands to the north and east. It also contains part of the perimeter dike and includes all areas outside the dike to the north and east. It is a geographic definition used primarily for classifying sampling locations. The site is currently used as a bird and wildlife sanctuary and will be transferred to the United States Fish and Wildlife Service (USFWS) for use as a National Wildlife Refuge [Tetra Tech EM Inc. (TtEMI), 1999].

The DON is conducting a remedial investigation on IR Site 2 with oversight from the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB) for the San Francisco Region. Preliminary results indicated that there is no existence of soil or groundwater chemical contamination that exceed the Total Threshold Limit Concentration (TTLC) hazard levels. Several known contaminants have been buried in the landfill and the threat of explosion due to contact with buried OE does exist.

Terrestrial wildlife species most susceptible to project activities include shorebirds, small mammals, and ground-dwelling birds. These species may be adversely affected by the mowing of existing vegetation to a 4-inch height. To minimize impacts to these species, clearing will not occur during the normal nesting season (April 1 through August 31).

Planned activities at the site include an accurate upland topographic survey, cutting the vegetation to a height of 4 inches, a surface OE characterization, the excavation of the Possible OEW Burial Site to a depth of 1 foot, and seismic and geotechnical evaluations. These activities will be performed in accordance with applicable federal and state regulations, including those standards that provide protection of air, water, land, human health, and cultural and biological resources.

1.0 GENERAL DESCRIPTION

This Explosives Safety Remediation Plan (ESRP) is being submitted in preparation for an ordnance and explosives (OE)/ordnance and explosives waste (OEW) surface characterization and Time-Critical Removal Action (TCRA) at Installation Restoration (IR) Site 2, Operable Unit (OU)-4A of former Naval Air Station (NAS) Alameda, Alameda Point, Alameda, California. The characterization will consist of a surface sweep to determine if OEW contamination exists on the site and the TCRA will involve the removal of the top 1-foot of topsoil in the 2.5-acre Possible OEW Burial Site. The format for this ESRP is based on an outline found in *Ammunitions and Explosives Ashore; Safety Regulations for Handling, Storing, Production, Renovation, and Shipping* of OP5 [Naval Sea Systems Command (NAVSEA, 2001).

The U.S. Department of the Navy (DON), Southwest Division Naval Facilities Engineering Command (SWDIV), directs these actions in accordance with requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Foster Wheeler Environmental Corporation (FWENC), as the general contractor, is responsible for conducting this work under contract number N44255-95-D-6030. The DON has initiated the planned characterization and TCRA at IR Site 2 to substantially eliminate, prevent, or abate any potential hazards associated with OE/OEW items. For purposes of this ESRP, OE/OEW are waste military munitions or munitions fragments derived from such military munitions as defined in the Military Munitions Rule [Department of Defense (DoD), 1998]. The OE may be used or unused, and may potentially be unexploded ordnance (UXO). Upon completion of the DON's Remedial Investigation/Feasibility Study and subsequent remedial actions, IR Site 2 will be transferred to the United States Fish and Wildlife Service (USFWS) for use as a wildlife refuge.

1.1 SITE LOCATION AND HISTORY

IR Site 2 is located on the western coastline of Alameda Point, Alameda, California, and includes the West Beach Landfill (the landfill), the West Beach Landfill Wetland (the wetland), and the associated interior and coastal margins. An area vicinity map can be found in Figure 2-1, a map of NAS Alameda can be found in Figure 2-2, and a map of IR Site 2 can be found in Figures 2-3 and 2-4. The landfill is sited on approximately 77 acres in the extreme southwestern end of Alameda Point. It was used as the main disposal area for the former NAS Alameda from approximately 1952 through 1982. An estimated 1.6 million tons of waste were deposited there [Ecology and Environment, Inc. (E&E), 1983]. The wastes included municipal solid waste, waste chemical drums (contents unknown), solvents, oily waste and sludge, paint waste, plating wastes, industrial strippers and cleaners, acids, mercury, polychlorinated biphenyl (PCB)-containing liquids, batteries, low-level radiological waste from radium dials and dial painting, scrap metal, inert ordnance, asbestos, several pesticides (solid and liquid), tear gas agent, biological waste from the Oak Knoll Naval Hospital, creosote, dredge spoils, waste medicines,

and reagents (E&E, 1983). Historical records indicate that OE/OEW, ranging in size from 4 feet long and 1 foot wide to smaller OE/OEW items, were also deposited in the 2.5-acre (approximate) Possible OEW Burial Site (as shown in Figure 2-3) located in the southern part of the landfill. [Supervisor of Shipbuilding Conversion and Repair (SSPORTS), 1999a]

1.2 PLANNED ACTIVITIES

Planned activities on the site include an accurate upland topographic survey, cutting the vegetation to a height of 4 inches, a surface OE characterization and the TCRA excavation of the Possible OEW Burial Site to a depth of 1 foot, the required remediation depth for land used as a wildlife refuge [Department of Defense Explosive Safety Board (DDESB), 1999]. These activities will be performed in accordance with applicable federal and state regulations, including those standards that provide protection of air, water, land, human health, and cultural and biological resources.

The following is a partial list of project plans prepared specifically for the activities planned for this site.

PROJECT PLANS

Plan	Version/Date
Base-Wide Health and Safety Plan	Final – 30 October 2001
Site-Specific Health and Safety Plan	Final – 30 October 2001
Site Work Plan	Draft-Final – 3 January 2002

1.3 REASONS FOR ORDNANCE AND EXPLOSIVES

Landfill burial records indicate that inert ordnance, 20-mm target practice (TP) rounds and other ordnance-like items were deposited in the landfill while it was in operation. Live 20-mm high explosive incendiary (HEI) rounds were discovered at IR Site 1 (immediately adjacent to IR Site 2) during a radiological survey conducted in 1998. A subsequent surface sweep of the area by SSPORTS UXO personnel in 1998 resulted in the discovery of 335 20-mm HEI rounds which were detonated as a part of an emergency removal action (SSPORTS, 1998). A surface characterization of the entire area of IR Site 1 by FWENC UXO personnel in 2001 resulted in the discovery of 1,079 20-mm TP rounds in one general location. Statements from former NAS workers told of ordnance-like items 4 feet long and 1 foot wide (and smaller) being buried in the landfill (SSPORTS, 1999a). A geophysical survey of IR Site 2 by SSPORTS personnel in 1999 revealed a 2.5-acre area within the landfill that contained several underground anomalies that were identified as possible OEW or UXO items. (SSPORTS, 1999b) This area has been titled "Possible OEW Burial Site" and is the area in which the TCRA will occur.

1.4 AMOUNT AND TYPE OF HIGH EXPLOSIVES

Except for the 20-mm TP rounds that were reported to have been buried in barrels, there is nothing in the records to identify types of OE/OEW that might be buried in the landfill. The records indicate that in 1976, four truckloads of inert ordnance ranging in size from 4 feet long and 1 foot wide to smaller ammunition were buried in the landfill (SSPORTS, 1999a). Similarly, except for general terms (truckloads), there is no information available to specifically identify amounts of OE/OEW deposited in the landfill.

1.5 MOST PROBABLE MUNITION

Historical records and the results of a recent surface characterization on an adjacent site are adequate to establish that the most probable munition (MPM) is the 20-mm HEI round. The maximum fragment throw range (case fragments) listed in Table 13-2 of OP-5 (NAVSEA, 2001) for 20-mm projectiles is 320 feet. This distance will be used as the initial quantity-distance (Q-D) arc for activities conducted at IR Site 2 and will be used to establish the exclusion zone (EZ).

1.6 EXECUTING AGENCIES

Points of contact for key personnel involved in the project are provided as follows:

Agency/Project Title	Point of Contact	Telephone Number
SWDIV Remedial Project Manager (RPM)	Mr. Rick Weissenborn	(619) 532-0952
SWDIV Resident Officer in Charge of Construction (ROICC)	Mr. Izzat Ahmadiyya	(510) 749-5947
FWENC Deputy Program Manager	Mr. Jamshid Sadeghipour	(949) 756-7519
FWENC Project Manager	Mr. Abid Loan	(949) 756-7514
FWENC Associate Project Manager/ UXO Coordinator	Mr. Lance Humphrey	(619) 471-3519
FWENC Project Superintendent/ Senior UXO Supervisor (SUXOS)	Mr. Jim Cocchiola	(973) 452-1458
FWENC UXOQC Engineer/ Site Health and Safety Specialist (SHSS)	Mr. Tony Crino	(619) 206-3344

FIGURES

2.0 MAPS

2.1 NAS ALAMEDA VICINITY MAP

Figure 2-1 shows the location of NAS Alameda relative to the state of California.

2.2 IR SITE 2 VICINITY MAP

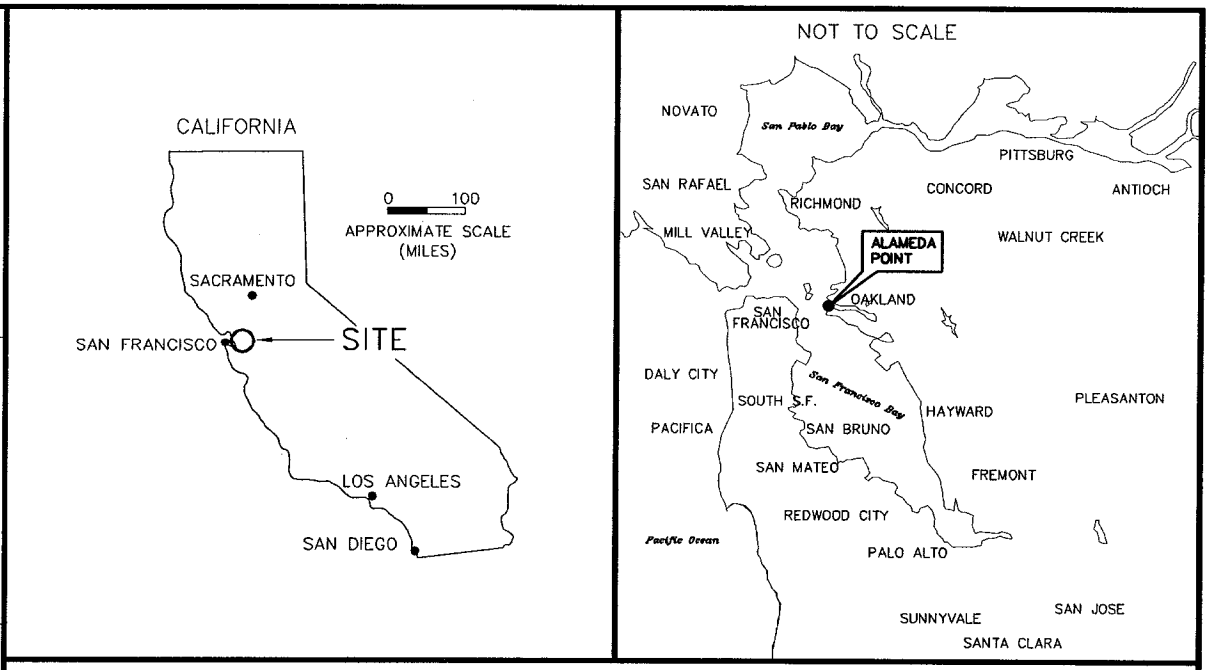
Figure 2-2 shows the location of IR Site 2 relative to other buildings and features on the base.

2.3 IR SITE 2 FEATURES

Figure 2-3 shows the boundaries of IR Site 2, the Possible OEW Burial Site, and the location and net explosive weight (NEW) for each magazine used by the project. The anticipated use of the site and the remediation depth for the excavation site are annotated.

2.4 IR SITE 2 Q-D ARCS AND EXCLUSION ZONES

Figure 2-4 shows established Q-D arcs and EZs.



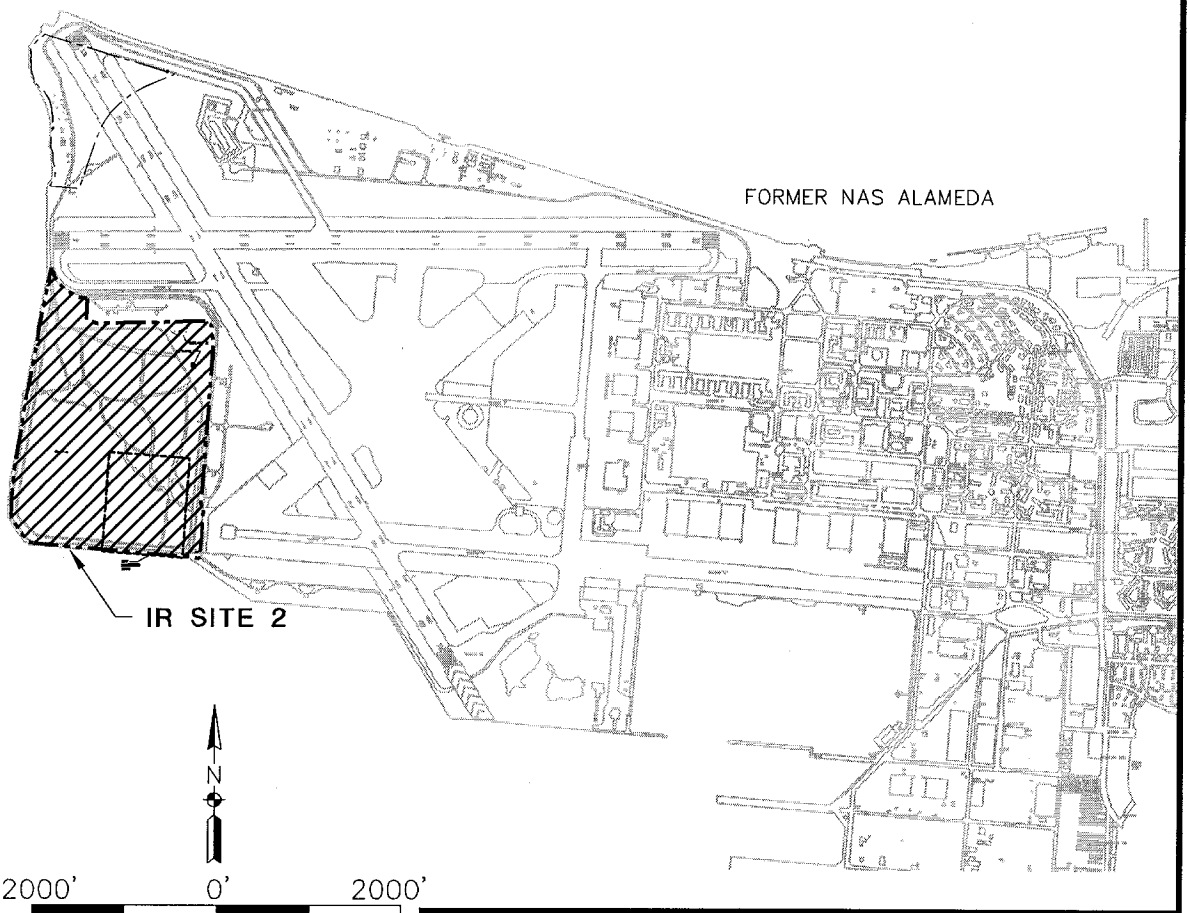


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Figure 2-1
ALAMEDA POINT VICINITY MAP
ALAMEDA, CA

Southwest Division
Naval Facilities Engineering Command

FOSTER WHEELER
ENVIRONMENTAL CORPORATION

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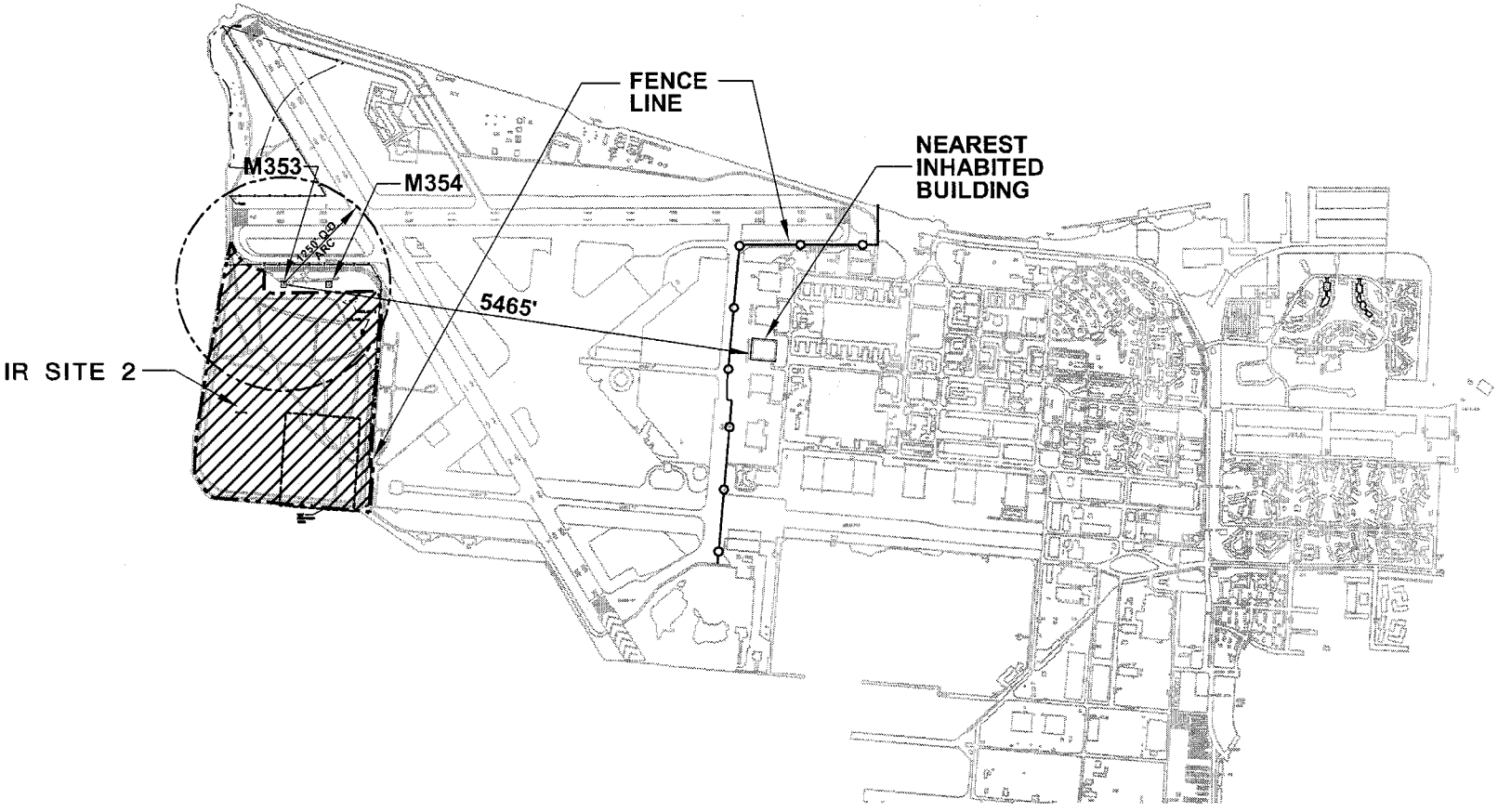

NOT TO SCALE

Figure 2-2
NAS ALAMEDA

Southwest Division
Naval Facilities Engineering Command

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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DO: # 0095

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OUTFALL HH
16" PIC
GATE
PERIMETER DIKE
442
TAXIWAY NO.1
441
4U
30" RC
TURNTABLE
M353
NEW 500#
M354
WETLAND 2
WETLAND 3
M56
SAN FRANCISCO BAY
NORTHERN POND
CULVERT
IR SITE 2
WETLAND BOUNDARY
M57
483
AB
TETRAHEDRO
480
SOUTHERN POND
30"R.C.
1U-1
M58
POSSIBLE OEW BURIAL SITE
320' EXCLUSION ZONE
25-2
E-W TAXIWAY
GATE
SITE 2 PLANNED USE: WILDLIFE REFUGE
TOP 1 FOOT OF TOPSOIL REMOVED
300' EXCLUSION ZONE
OUTFALL #U
2T
12"RC
1T
OUTFALL #T
M50
SAN FRANCISCO BAY

N

400 200 0 400
SCALE IN FEET

LEGEND
- SITE BOUNDARY
- FENCELINE
- EXCLUSION ZONE (320 FT.)

Figure 2-3
IR SITE 2 FEATURES

Southwest Division
Naval Facilities Engineering Command

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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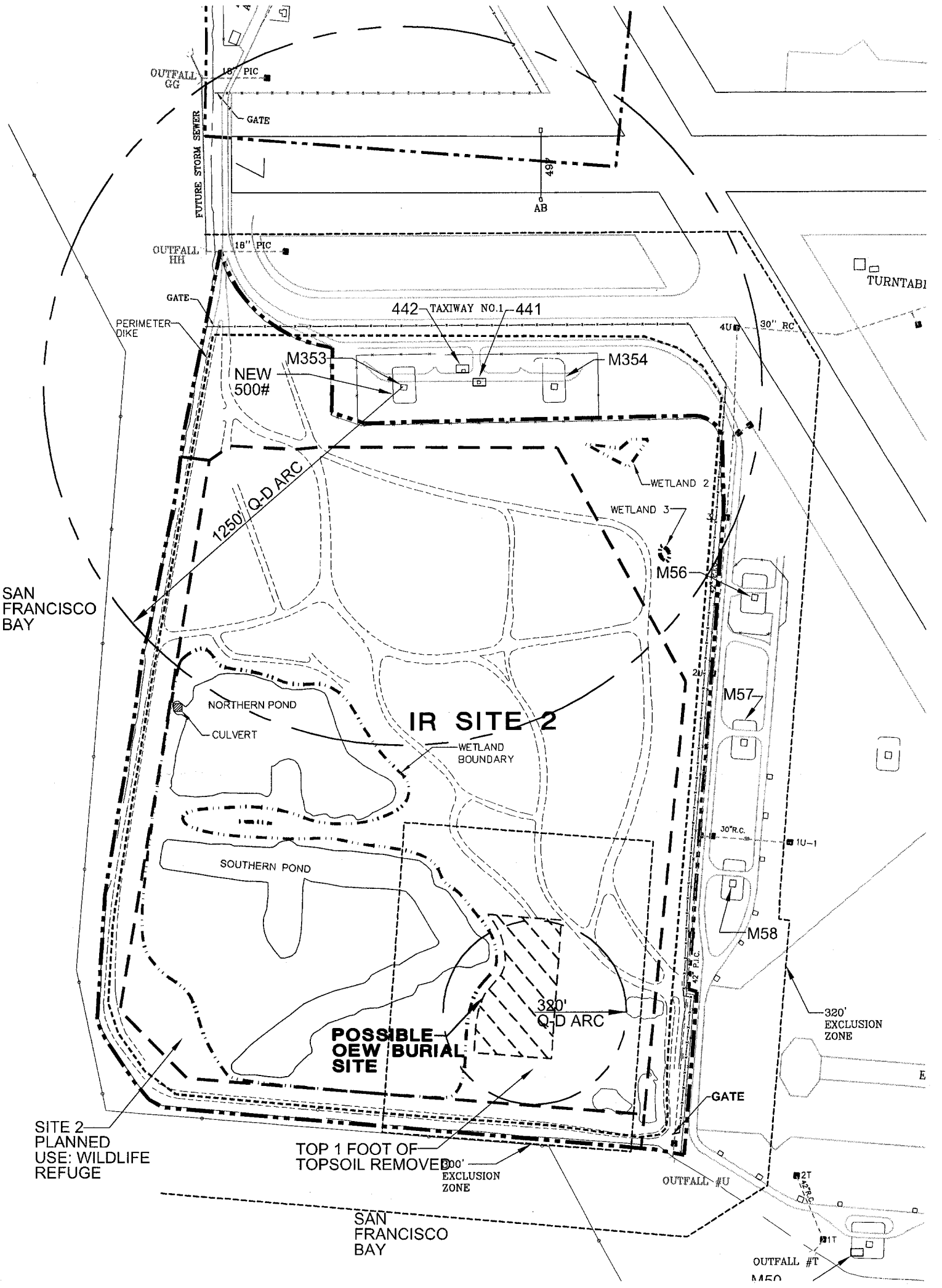

Figure 2-4
IR SITE 2-Q-D ARC AND EXCLUSION ZONE

Southwest Division
Naval Facilities Engineering Command

FOSTER WHEELER ENVIRONMENTAL CORPORATION

3.0 UNEXPLODED ORDNANCE

3.1 AMOUNTS AND TYPES OF OE/UXO

Except for the 20-mm TP rounds that were reported to have been buried in barrels and four truckloads of inert ordnance, there is nothing in the records to identify types of OEW that might be buried in the landfill. Information gained from interviews indicate that ordnance-like items 4 feet long and 1 foot wide (SSPORTS, 1999a) to smaller items were buried there on one occasion and four truckloads of inert ordnance were reportedly deposited there on another. Similarly, except for general terms (truckloads), there is no information available to specifically identify amounts of OEW buried in the landfill.

3.2 START DATE

Start dates for the activities planned at IR Site 2 are provided as follows:

Activity	Start Date
Mowing/Vegetation removal	11 December 2001
1000-foot x 1000-foot grids surveyed	9 January 2002
200-foot x 200-foot grids surveyed	14 January 2002
OE/OEW characterization	21 January 2002
Possible OE/OEW Burial Site excavation	4 March 2002

3.3 FROST LINE

There is no frost line in Alameda, California.

3.4 RISK ASSESSMENT/HAZARD EVALUATION

A risk assessment for the TCRA was completed and included in the Action Memorandum for a CERCLA TCRA (FWENC, 2002). The risk assessment was completed following procedures found in the Risk Assessment Procedures for Ordnance and Explosives Sites worksheet, found in the U.S. Army Corps of Engineers' pamphlet on Ordnance and Explosives Response (EP 1110-1-18). Risk evaluation results indicated that the hazard severity category was "critical" and the hazard probability was "probable". The combination of these two factors resulted in a Risk Assessment Code (RAC) 2 rating. The RAC 2 rating and information contained in the public record demonstrated that conditions at the site warranted the conduct of the TCRA. The probability of contacting live ordnance is considered remote, but cannot be ruled out. Therefore, the explosive risks for ordnance items in the Possible OEW Burial Site are considered to present an imminent and/or substantial endangerment.

3.5 CLEARANCE TECHNIQUES

This section summarizes the two techniques that will be used to address OE/OEW at IR Site 2, a surface characterization of the entire site and the TCRA, which will consist of the removal of the top 1-foot of soil in the Possible OEW Burial Site.

The hazards associated with uncovering OE/OEW include injury from inadvertent detonation and explosion of munitions, thermal or chemical burns, and chemical exposure to explosives and explosive products. There is also a risk that non-UXO trained workers could come into contact with these hazards. The potential for contact with OE/OEW will be minimized through the use of engineering controls and FWENC procedures. UXO Technicians will conduct all intrusive activities. The SUXOS will have overall responsibility and accountability for all OE/OEW materials. If OE/OEW is encountered during the surface characterization or TCRA excavation, FWENC UXO Technicians will immediately stop work, mark the location of the OE/OEW items, and notify the SUXOS. At no time will non-UXO-trained employees or subcontractors be responsible for identifying, handling, or removing UXO.

A listing of the most pertinent rules for handling OE/OEW materials that will be enforced throughout the project are as follows:

- Assume that OE/OEW contains a live charge until it can be determined otherwise.
- Avoid inhalation of, and skin contact with, smoke fumes and vapors of explosives and related hazardous materials.
- Consider OE/OEW that has been exposed to fire or detonation as extremely hazardous. Chemical and physical changes to the contents, may have occurred which can render it much more sensitive than its original state (changes to the condition of the fuze or explosives).
- Make every effort to identify the OE/OEW. Carefully examine the item for markings and other identifying features such as shape, size, and external fittings. Do not move the suspected OE/OEW item.
- Plan for, provide, and know the measures to be taken in the event of an accident.
- Provide a designated emergency vehicle in the area in case of an accident or an emergency.
- Do not handle, use, or remain near explosives during the approach or progress of an electrical storm. All personnel should move to a safe place.
- Do not allow unauthorized or unnecessary personnel to be present near the OE/OEW.
- Always base operations on minimum exposure consistent with efficient operations.
- Do not rely on color-coding of OE/OEW for positive identification of contents. Munitions without color codes or having incomplete, or improper color codes have been encountered.

- Avoid the area forward of the ammunition's nose until it can be determined that the item is not a shaped-charge or high-explosive antitank round. The explosive jet can be fatal to great distances forward of the item's longitudinal axis. Assume that any shaped-charge munitions contain a piezoelectric fuzing system, until the fuzing is otherwise identified. Piezoelectric fuzes are extremely sensitive, can fire at the slightest physical change, and may remain hazardous for an indefinite period.
- Approach an unfired rocket motor from the side. Ignition will create a missile hazard and hot exhaust. Do not expose electrically fired rocket motors within 25 feet of any exposed electronic transmitting equipment or antenna leads.
- Some practice bombs do not contain any positive safety features. Positively identify and review all safety precautions prior to handling practice bombs.

3.5.1 Grid Installation/Data Recording

Site grid staking for UXO characterization and burial site excavation will be surveyed based on horizontal and vertical control (benchmark) established by Kister, Savio, & Rei (KSR) (FWENC Surveyor) located at Main and Atlantic Streets, Alameda, California. The vertical datum will be oriented to California coordinate system National Geodetic Vertical Datum 29 (NGVD29) and horizontal survey datum to North America Datum 83 (NAD83). The grids will be superimposed on a computer-assisted drafting (CAD) drawing of NAS Alameda. The exact location of items found during the characterization and excavation will be geo-referenced by northing and easting distances from the southwest grid stake in the grid found. The locations will be plotted on the CAD site map and will be incorporated into the geographic information system (GIS) for NAS Alameda. Digital photographs will be taken of every item found during the characterization and excavation. The photographs will be geo-referenced to the appropriate grid and recorded in the project photograph log. The photographs and the photograph log will be provided to the DON at the end of the project.

3.5.2 Surface Characterization

After the installation of a 200-foot by 200-foot grid network on IR Site 2, the Surface Characterization Team will conduct a systematic, grid-by-grid sweep of the site. The team will form a line abreast spaced in a manner that permits a slight visual overlap of individual lanes. The team member on one end of the line will act as the guide and navigate a straight path between grid boundaries using the grid stakes as initial guideposts. A bright orange traffic cone will be placed on the ground adjacent to the person on the opposite end of the line. The team will maintain alignment and spacing with the guide as the sweep proceeds. When the team reaches the opposite end of the grid, the line will stop, and another traffic cone will be placed on the ground marking the outside boundary and stopping point for the sweep. The traffic cones will be positioned in a manner that allows a slight overlap of the sweep lanes and will then become the guideposts for the next sweep. Each team member will sweep the probe of a Schonstedt GA-52 CX in small arcs in front of them as they proceed (this technique focuses the vision on the

ground in front and provides an audible backup.) This process will be followed until the grid is cleared and then repeated in every grid until the site has been swept.

3.5.3 Time-Critical Removal Action Excavation

The end use of IR Site 2 is known. When remediation measures have been completed on the site, the land will be transferred to the USFWS and will become the Alameda National Wildlife Refuge. Land use controls are planned for the site that will prohibit construction. Access to the site will be very restricted, and the site is fenced to prevent unauthorized entry. For these reasons, the interim planning default depth of 1 foot was chosen as the recommended excavation depth for the Possible OEW Burial Site. While it does not eliminate the possibility that residual OE/OEW may exist at depths greater than 1 foot in the site, it does reduce the risk of human encounters with OE/OEW to a level acceptable to the regulators and the stakeholders.

The Possible OEW Burial Site is relatively flat, lightly vegetated, and imposes no limitations on planned excavation activities. The process selected for the excavation is determined to be optimum for the existing geological and topographical conditions.

Following the grass cutting and surface OE/OEW characterization, the TCRA (excavation) will be conducted as follows:

- The corners of the 2.5-acre (approximate) Possible OEW Burial Site will be marked by surveyors, the site boundaries will be marked with surveyors tape and a 20- by 20-foot grid network (approximately 250 grids) will be installed. The intrusive excavation will be conducted by a team under the direct supervision of the SUXOS. The team will consist of compact excavator operators, excavation monitors, a front-end loader operator, a screening plant operator, and UXO Technicians.
- A screening plant will be placed in a flat area immediately adjacent to one of the dirt roads that traverse IR Site 2 near the Possible OEW Burial Site.
- Excavation of the possible OEW Burial Site grids will be conducted from the outside-in and will begin with the grids that are located on the road(s).
- UXO Technicians, acting as Excavation Monitors, will check the first grid to be excavated with the Vallon Mine Detector (1600 series). This detector is capable of detecting a 20-mm round at a depth of 12 inches. If metal is detected, the UXO Technician will localize the site and probe the area to determine if the anomaly is located within 12 inches of the surface. If it is within 12 inches of the surface, the UXO Technician will carefully remove the soil covering the object, until the identity of the object can be ascertained. If the object is not OE/OEW, the process will be repeated until the entire grid is cleared.
- If OE/OEW is unearthed, all work on the site will stop, and non-UXO personnel will leave the site and proceed outside the EZ boundary or to a distance determined by the SUXOS. The SUXOS will positively identify the OE/OEW, determine its status

(unarmed, fuzed and fired, inert, and so forth) and follow disposition procedures found in Attachment 1, Standard Operating Procedure 1 (SOP-1), of this document.

- When the top 12 inches of soil in the grid have been cleared, the compact excavator will be positioned on the outside grid boundary and the bucket arm will be extended 10 feet into the grid. The top 6 inches of soil will be dragged 10 feet to the edge of the grid line, removed, and then placed in a small stockpile behind the excavator. A UXO Technician will monitor the depth of the bucket to ensure the 6-inch lifts are consistent. The excavators will repeat the soil removal process in 6-inch lifts until the first 10 feet of the grid is cleared to a depth of 1 foot.
- When the top twelve inches of topsoil have been removed from the first 10 feet in the grid, the excavator will be repositioned in the grid next to the remaining, un-excavated 10-foot grid portion. The Vallon Mine Detector-scan and 6-inch removal process will be repeated in the next 10 feet of the grid, until the entire grid has been excavated to a depth of 1 foot.
- The finished grid will then become a clean cell and annotated on the field map.
- The Vallon Mine Detector-scan and 6-inch lift removal process will be repeated in each grid until the entire Possible OEW Burial Site has been cleared.
- When the Possible OEW Burial Site has been excavated to a depth of 1 foot, a front-end loader will transport the stockpiled soil to the screening plant. The screening plant will be equipped with a 4-inch Grizzly and a ½-inch shaker screen. A UXO Technician will monitor the tailings and the debris removed by the Grizzly and shaker screen. If any OE/OEW is discovered in the tailings or debris stream, all work will stop, non-UXO personnel will leave the area, and the procedures established above will be followed.
- When the topsoil from the Possible OEW Burial Site has been excavated and processed through the screening plant, the tailings will be used to backfill the excavation site, and the screened materials will be segregated for recycling or landfill disposal, as appropriate.
- OEW scrap encountered will be carefully examined by the SUXOS for energetic material. Scrap that is found to still contain energetic material or residue will be transported to Magazine 353 for later disposition. OEW scrap that does not contain energetic material will be collected, segregated by metal type, demilitarized in accordance with DoD Instruction 4160.21-M-1 and transferred to a Class III Landfill for disposal.
- Stakes, line levels, and a surveyor's transit will be used by the UXO Technicians to re-survey the excavated site to verify that a uniform soil removal depth of 1 foot was achieved.

Operator Protection Requirements

The MPM has been determined to be a fired 20-mm HEI round with a single-action point detonating nose fuze. Based on the site history, earlier survey results, planned procedural and protective measures, and the MPM and the hazards analysis, it is assumed that the probability of

an accidental explosion will be low, the risk level will be acceptable, and the safety measures and personal protective equipment planned for personnel safety are adequate. Operational shields will be used during soil sifting and projectile demilitarization activities. Site personnel are all explosive ordnance disposal (EOD) school graduates and will be familiarized with the explosive weight/type, fuze firing sequence, fuze sensitivity, hazards, and safety precautions for the MPM. Ordnance-specific publications used to estimate risk levels and hazards included OP 1664, ORD Data II, TM-9-1900/1901/1901B TM 9-2200, TM 43-001-28, among others.

Handling Ordnance and Ordnance Waste

If OE and OEW are encountered during the characterization or removal action excavation, the SUXOS will immediately be notified and a positive identification of the item will be made. When the OE/OEW is identified, the SUXOS will confirm it and UXO personnel will remove the item and transport it to Magazine M353, only upon determination that it is safe to move. If it is determined that the OEW is not safe to move, the OEW item will be marked, and work will cease until the Travis Air Force EOD Detachment can respond.

After the OE/OEW is identified and a determination has been made as to its ability to be moved, the SUXOS will notify the Project Manager, ROICC, and RPM to discuss and initiate prudent and necessary measures (for example, removal of personnel from the area if an immediate short-term danger exists). If any personnel in the sequence are not available, the next person on the list will be notified. If OE is found that is larger than the MPM, operations will be stopped until the situation can be evaluated and the Work Plan, Site Health and Safety Plan, and other project documents (as determined by the Project Manager, SUXOS, ROICC, and RPM) are modified to account for the new information, if required. Re-initiation of work will take place only with the approval of the DON RPM and the SUXOS.

OEW will be visually inspected to confirm that no visible explosive residue remains. The waste will then be inventoried (location of discovery and type of item recorded), containerized, and stored in Magazine M353 to wait for final disposition.

Non-hazardous, non-ordnance items recovered will be stockpiled and consolidated for future recycling or landfill disposal.

Information will be recorded for all ordnance items recovered. For recovered OE items, a UXO Acquisition and Accountability form will be filled out and will include the date, grid number, location, survey method, location method, length, width, orientation, shape, weight, and photo identification.

The date, grid number, and location of recovered OEW will be recorded along with the item description. Detailed data will not be collected for scrap metal and other non-ordnance items, other than number of items per grid.

Procedures for accounting and processing OEW and OE scrap can be found in Attachment 1, SOP-1.

3.5.4 Quality Assurance/Quality Control

This section provides an overview of significant quality control (QC) information as it applies to the ESRP. Specific and detailed components of the quality assurance (QA)/QC program have been be finalized in the Project Contractor QC Plan. The information presented below is information which has already been approved for contractor OE and OEW work at the site under the TCRA. The contractor will coordinate, monitor, and oversee all activities on site, including verifying compliance with the processes described herein and verifying actions taken.

Contractor Organization

QC is conducted using a three-phase control process, preparatory inspection, initial inspection, and follow-up inspections. These are performed to ensure that processes are in control and opportunities for improving processes are captured and implemented. The three-phase QC program is based on the three phases of Contractor QC procedures. Each significant activity identified as a definable feature at the site undergoes the three-phase control process.

Dedicated personnel, who have "stop work" authority and are organizationally independent from the processes, are assigned to conduct QC. The project is supported by a QC Program Manager, who visits the site on a regular basis.

The contractor Project Manager, Site Superintendent, and SUXOS are all committed to ensuring that the QC process is maintained. This level of commitment is implicit in the job description and the individual qualifications for the position.

Quality Assurance/Quality Control Processes

Each component of site work has a built-in QC function to ensure that safe work practices are followed, the provisions of the established plans are adhered to, and collected data is accurate and defensible. The detailed QA/QC procedures are outlined in specific work plans for the phases of the project. Several significant aspects are summarized in this section.

Prior to beginning the characterization activities, the Surface Characterization Team will be certified in a QC test grid using the Search Effectiveness Probability (SEP) Test. The test grid will be seeded with 34 target items that are representative of the MPM. The Surface Characterization Team will form a line abreast and conduct a sweep of the grid following procedures described previously. Each team member will use a Schonstedt GA-52 CX metal locator with an audible detection alarm to aid in the visual search of the grid. To gain certification to conduct characterization operations, the team must demonstrate the ability to achieve an 85 percent probability of detection (PD) with a 90 percent confidence level (CL) of

removal of target items, which will require locating 32 of the 34 seeded targets. If less than 32 items are located, the team must continue training until they can achieve the 85 percent PD at a 90 percent CL. When (if) new team members that have not previously been certified in surface clearance operations are added to a team, the entire team must proceed through the surface clearance test grid and demonstrate the ability to achieve an 85 percent PD at a 90 percent CL before conducting field operations. Establishing the test grid and processing the team through the test grid is a QC function and must remain separate and independent from operations.

A Vallon mine detector/magnetometer test grid will be established and seeded with a pre-determined amount of 20-mm TP rounds buried at a depth of 12 inches. Prior to commencing daily excavation activities, the UXO Technicians will pass their magnetometers over the test grid to ensure the equipment is calibrated and functional. All of the buried rounds must be detected for the equipment to be used on the project. The project QA/QC Representative will record the calibration of the magnetometers on a daily basis.

The elevation of grid stakes in the Possible OEW Burial Site will be obtained by a FWENC UXO team member using a surveyor's transit and grade stick. After removal of the top 1 foot of topsoil from the site, FWENC UXO team member will use the same equipment to verify a uniform 1-foot removal of soil within the site.

3.5.5 OE/OEW Disposition

If OE/OEW that the FWENC SUXOS has determined to be unsafe to move or transport is encountered, the EOD Detachment at Travis Air Force Base will be notified and requested to respond. Prior to beginning blow-in-place (BIP) procedures, if they are necessary, the required notifications will be made, the EZ will be adjusted and enforced by the Alameda Police Department. SOP-1 in Attachment 1 describes procedures for BIP operations.

OE/OEW that is not safe to move will be detonated in place by the Travis Air Force Base EOD Detachment. California regulations (California EPA and the DTSC) prohibit open burn or open detonation (OB/OD) as a means of treating OE/OEW on California sites and the regulations also prohibit California military bases from accepting off-site waste military munitions for treatment. Accordingly, OE encountered during the TCRA that is safe to move and transport will be consolidated in Magazine M353 until the completion of activities on the site (less than 60 days). The OE/OEW will then be packaged, manifested, and shipped in accordance with state and federal regulations to McAlester Army Ammunition Plant located in Crane, Indiana, for treatment. This process will require certain events to be accomplished as follows:

- A positive identification of the OE and a determination as to its safe-to-ship status will be made by the SUXOS.
- A request for an Interim Hazard Classification (IHC) will be requested from Naval Ordnance Safety and Security Activity (NOSSA) for each OE item(s) being shipped.

- When the IHC is received from NOSSA, the FWENC SUXOS will generate an Explosive Shipment Certification (ESC) that certifies the OE as safe to ship. The IHC will also contain a DoD Hazardous Classification for each OE item.
- The IHC, DoD Hazardous Classification, and ESC will be provided to the NAVSEA, Earl Detachment; the Naval Packaging, Handling, Storage, and Transportation Center (PHST) is where a Department of Transportation (DOT)-compliant package designed for each OE item will be developed.
- A qualified and certified hazardous material packaging company (REMTEC) has been identified and will mobilize to the site if OE is found. REMTEC will construct the packaging in accordance with drawings provided by PHST, package each OE item, and complete a manifest for the OEW items being shipped.
- FWENC personnel will complete and submit Section 1 of the Hazardous Waste Profile Sheet, a copy of the Land Disposal Restriction Certification, the IHC, DOT Hazardous Classification, ESC, and California Hazardous Waste Manifest.
- A qualified and certified hazardous materials transportation company will be identified and will mobilize to the site if OE is to be shipped. The transporter will supervise the loading of the packaged OE onto the vehicle, take possession of all of the required documentation, and transport the OE to McAlester Army Ammunition Plant for treatment.
- The OE will be received at the McAlester Army Ammunition Plant transfer facility where the load will be examined and the hazardous waste manifest signed with any discrepancies noted. The OE will then be sent either to the appropriate OB/OD facility or stored under conditional exemption [as allowed by 40 Code of Federal Regulations (CFR), Part 266.205] until it can be treated.

3.5.6 Technical Support

Support for the TCRA will be required from different agencies as follows:

Agency	Support Needed
NOSSA	– Review and approve Explosives Safety Submission
	– Provide IHC
PHST	– Provide packaging drawings and DOT exemption
McAlester Army Ammunition Plant	– Provide treatment for OEW
Travis Air Force Base EOD Detachment	– Emergency removal action for OEW found unsafe to move or transport

4.0 ACCESS

There are three fences that must be crossed to gain access to IR Site 2. The first fence separates the main air station from the runway and tarmac areas. The second fence crosses the runway section about mid-field and is intended to prohibit access to the California least tern nesting area. All gates on both fences are kept locked, and the keys are maintained by the NAS Environmental Compliance Officer. The third fence surrounds IR Site 2 on the north and east sides while San Francisco Bay is located on the south and west sides. There is an access gate located on the north and east fences (Figure 2-3). The gates will remain locked during mowing, surface OE/OEW characterization, and TCRA operations and will act as the primary engineering control used to prevent access to non-UXO-qualified personnel. The NAS Environmental Compliance Officer controls the access and maintains the keys to these gates. When fieldwork is taking place, the SUXOS will maintain a duplicate set of gate keys and will control the entrance to and exit from IR Site 2.

The magazine compound contains Magazines M353 and M354, an abandoned guard tower (Building 441), and storage building (Building 442). Both magazines are approved for 15,000 pounds NEW and are in good condition, but only Magazine M353 is planned for use. A NEW limit of 500 pounds has been established for the magazine, which will require a 1,250-foot Q-D arc as shown in Figures 2-2 and 2-4. There are no operating or inhabited buildings within the arc. The magazine is secured by a Sargeant-Greenleaf Model 833 lock and the gate to the compound is locked as well. The FWENC SUXOS maintains control of the keys to the magazine compound and the magazine locks.

5.0 RESTRICTIONS

The Feasibility Study, when published, will determine the most appropriate remediation approach for site and institutional controls. Land use restrictions that will limit the site to at least non-residential use only are anticipated.

6.0 PUBLIC INVOLVEMENT

The public will be given the opportunity to review and provide comments to the following documents:

Document	Review Period
Action Memorandum for a TCRA	60 Days for the Draft Version/30 days for the Draft Final Version
Remedial Investigation Report	60 Days for the Draft Version/30 days for the Draft Final Version
Feasibility Study	60 Days for the Draft Version/30 days for the Draft Final Version
Proposed Remediation Plan	60 Days for the Draft Version/30 days for the Draft Final Version
Record of Decision	60 Days for the Draft Version/30 days for the Draft Final Version

7.0 REFERENCES

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ATTACHMENT 1

STANDARD OPERATING PROCEDURE

(SOP-1)

ORDNANCE AND EXPLOSIVES WASTE/ UNEXPLODED ORDNANCE DISPOSAL DISPOSITION

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, CA 92132-5190

CONTRACT NO. N44255-95-D-6030
DO NO. 0095

FINAL

STANDARD OPERATING PROCEDURE
ORDNANCE AND EXPLOSIVES WASTE/ UNEXPLODED ORDNANCE DISPOSAL DISPOSITION
(SOP-1)
Revision 0
February 8, 2002

ORDNANCE AND EXPLOSIVES WASTE CHARACTERIZATION, TIME-CRITICAL REMOVAL ACTION, AND GEOTECHNICAL AND SEISMIC EVALUATIONS AT INSTALLATION RESTORATION SITE 2 ALAMEDA POINT ALAMEDA, CALIFORNIA

DCN: FWSD-RACII-02-0132

Prepared by:

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UXO Operations Manager

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ATTACHMENTS

ABBREVIATIONS AND ACRONYMS

AFB	Air Force Base
BIP	blow-in-place
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CQC	Contractor Quality Control
DoD	Department of Defense
DON	U.S. Department of the Navy
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
ECM	Environmental Compliance Manager
EMER	explosives or munitions emergency response
EO	expended ordnance
EOD	explosive ordnance disposal
EODB	explosive ordnance disposal basic
EOR	Explosive Ordnance Reconnaissance
EPA	U.S. Environmental Protection Agency
ESS	Environmental Safety Specialist
EZ	Exclusion zone
FWENC	Foster Wheeler Environmental Corporation
GIS	Geographical Information System
HERO	Hazardous of Electromagnetic Radiation to Ordnance
IR	Installation Restoration
NAS	Naval Air Station
NAVEOD	Naval Explosive Ordnance Disposal
NAVSEA	Naval Sea Systems Command
OD	open detonation
OE	ordnance and explosives
OEW	ordnance and explosive waste
OU	Operable Unit
PjM	Project Manager
PPE	personal protective equipment
QA	quality assurance
QC	Quality Control

ABBREVIATIONS AND ACRONYMS
(Continued)

RI	Remedial Investigation
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board
SHSP	Site-Specific Health and Safety Plan
SHSS	Site Health and Safety Specialist
SOP	Standard Operating Procedure
SUXOS	Senior UXO Supervisor
USACE	U. S. Army Corps of Engineers
USAF	United States Air Force
UXO	unexploded ordnance

DEFINITIONS

Exclusion zone (EZ)—Areas where contamination (hazards) is known or likely to be present, or areas that, because of activity, have the potential to cause harm to personnel. Once ordnance and explosives waste (OEW) are detected, the EZ will be expanded to 1,250 feet for non-fragmenting explosive materials, 2,500 feet for fragmenting explosive materials, or 4,000 feet for bombs and projectiles with 5-inch and greater caliber. The EZ shall be large enough to protect other personnel from the blast and fragmentation hazards of accidental detonation. The minimum EZ for unexploded ordnance (UXO) operations will be 300 feet.

Expended ordnance (EO)—Ordnance that has functioned as designed, leaving the shell or container behind. This shell or container may or may not contain explosive/pyrotechnic/toxic residue. This material would not be considered inert and could not be salvaged as scrap without appropriate visual inspection, sampling, and/or treatment.

Explosive Ordnance Disposal (EOD) Personnel— Active-duty military personnel who have graduated from the U.S. Naval School for EOD, Eglin Air Force Base, Florida, the U.S. Bomb Disposal School, Indian Head, Maryland, or are graduates of the EOD Assistant Course, Redstone Arsenal, Alabama, and are currently assigned to a military facility or activity.

Foster Wheeler Environmental Command Center—A designated location staffed by personnel to relay and control all communications/activities of field personnel and other units.

Inert ordnance—Ordnance that never contained explosives (that is, munitions manufactured as classroom training aids) or ordnance that has had all explosive components removed and has been certified as safe.

Intrusive Investigation—Excavating for suspected UXO items or for plotted anomalies. Excavation will be by hand or will be done using heavy equipment as deemed appropriate.

Non-Intrusive Investigation—Locating/investigating UXO on the surface of the ground where excavation is not required.

Non-ordnance and explosive metal debris—Metal debris recovered during operations which is not ordnance related, such as metal rebar, angle iron, sheet metal and bar stock, and so forth.

Open detonation (OD)—A method of disposal for explosive ordnance where a donor explosive charge is detonated in contact with the ordnance to achieve a high-order detonation of the energetic materials contained within the ordnance.

Ordnance and explosives (OE)—Bombs, guided and ballistic missiles, artillery, mortars, rocket ammunition, small arms ammunition, anti-personnel and anti-tank mines, demolition charges, pyrotechnics, grenades, sea mines, torpedoes, depth charges, containerized and non-containerized high explosives and propellants, depleted uranium rounds, military chemical agents, and all similar components related to munitions that were designed to cause damage to personnel or material through explosive force, incendiary action, or toxic effects. Non-containerized high explosives, propellants, or soils contaminated with explosive constituents are

considered explosives if the concentration of explosive material is 10 percent or higher, by weight.

Ordnance and explosive metal debris—Ordnance materials which have not been in direct contact with the energetic materials of the ordnance, such as bomb fins, grenade spoons, shipping containers, and so forth. These shells or containers may or may not contain explosive, pyrotechnic, or toxic residues. Materials will not be considered inert, and will not be salvaged as scrap, without appropriate visual inspection, sampling, and/or treatment.

Ordnance and Explosive Waste (OEW)—Ordnance materials which have been in direct contact with the energetic materials of the ordnance, such as expended rocket motors, shell casings, warhead fragments, powder containers, and so forth.

Practice ordnance—Munitions that demonstrate characteristics similar to their high explosive counterparts and that may or may not contain pyrotechnic, explosive, or chemical (that is, titanium tetrachloride) spotting charges.

Unexploded ordnance (UXO)— Military munitions that have been primed, fused, armed, or otherwise prepared for action that have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material, and that remain unexploded either by malfunction, design, or any other cause. This term is used many times in place of OE as an all-encompassing term.

UXO personnel— Contractor personnel who have completed specialized EOD military or U.S. Department of Defense (DoD)-approved civilian training in EOD methods. Various grades and contract positions are established based on skills and experience.

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish procedures for the disposition of recovered ordnance and explosive waste (OEW) in support of characterization and Time-Critical Removal Action activities at Installation Restoration (IR) Site 2, Operable Unit (OU) 4A of former Naval Air Station (NAS) Alameda, Alameda Point, Alameda, California, by Foster Wheeler Environmental Corporation (FWENC). The primary consideration of this SOP is the protection of human health and the environment.

2.0 SCOPE

Initial activities involved in the OEW surface characterization and Time-Critical Removal Action in the Possible OEW Burial Site area will consist of cutting site vegetation to a height of 4 inches or less and establishing a grid network to identify relative positions of OEW, if any is found. When those activities are complete, a surface characterization of the entire site will be conducted. The removal action will require the removal and sifting of the top 1 foot of material in the Possible OEW Burial Site.

2.1 SURFACE CHARACTERIZATION

The vegetation on IR Site 2 will be cut to a height of 4 inches (or less) prior to the beginning of the surface OEW investigation. FWENC unexploded ordnance (UXO) personnel will proceed ahead of the mowing equipment to prevent encountering OEW. Following the locating, marking, and mapping of the corner points of the site using existing Geographical Information System (GIS) data, a local Cartesian Coordinate grid system will be established to enable the UXO Specialists conducting the surface investigation to identify relative positions of OEW, if any are located. The coordinate axes will have an origin on the southwestern corner of the site and will be spaced 200 feet apart, creating a network of 200- by 200-foot grids. The Y-axis will run north-to-south, the X-axis east-to-west, and the points where grid lines intersect will be marked with surveyors flags. UXO Specialists will prosecute the site in a line abreast, spaced sufficiently near one another to ensure complete visual coverage as the sweep line navigates systematically through the grid. If any OEW is encountered, its location will be referenced by an abscissa/ordinate intersection point using the appropriate alphanumeric label of the grid's placement within the coordinate system.

3.0 PERSONNEL REQUIREMENTS

The key operational, on-site FWENC personnel involved in the performance of explosive demolition operations include the Project Manager (PjM), Site Superintendent/Senior UXO Supervisor (SUXOS), Site Health and Safety and Specialist (SHSS), Project Quality Control Manager, UXO Supervisor, and UXO Specialists. For this project, the SUXOS will act as the Site Superintendent.

Project Manager

The PjM will be the main point of contact with the DON for all project-related matters and he will be responsible for the overall conduct and performance of the project. The FWENC PjM will interface directly with the U.S. Department of the Navy's (DON's) Remedial Project Manager (RPM). The PjM is primarily responsible for the development and implementation of the Focused Remedial Investigation (RI) Work Plan, which includes coordination among the task leads and support staff, acquisition of engineering or specialized technical support, and all other aspects of the day-to-day activities associated with the project. The PjM identifies staff requirements, directs and monitors project progress, ensures implementation of quality procedures and compliance with applicable codes and regulations, and is responsible for performance within the established budget and schedule.

Site Superintendent

FWENC is ultimately responsible for the on-site health and safety of FWENC personnel working on this project. The Site Superintendent, with the support of FWENC's SHSS, is responsible for implementation of the Focused RI Work Plan, Site-Specific Health and Safety Plan (SHSP), and all on-site activities on a daily basis. Other responsibilities include, but are not limited to: 1) project planning, 2) scheduling, 3) site documentation, 4) regulatory compliance, 5) personnel assignments, 6) customer and subcontractor relations, 7) enforcing health and safety rules and SHSP requirements, and 8) conducting routine safety inspections and incident investigations. The Site Superintendent reports directly to the PjM.

Senior UXO Supervisor

The SUXOS assists in the development of site-specific work plans, identifies personnel and equipment requirements, and directly supervises all daily activities of the field team. The SUXOS is responsible for the successful performance of the field team, the early detection and identification of potential problem areas, and instituting corrective measures. The SUXOS is also responsible for execution of instructions received from the FWENC PjM and the DON RPM, documentation of site conditions, photographing UXO recovery, preparation of all project reports, and identifying any effort required to accomplish the scope of work. The SUXOS is responsible for all aspects of explosive safety.

Site Health and Safety Specialist

The SHSS will be UXO-qualified with at least 10 years of experience and have completed the FWENC Environmental Safety Specialist (ESS) cross training. The SHSS will be responsible for the implementation of the SHSP, on-site training requirements, and recommending changes to the level of personal protective equipment (PPE) to the Certified Industrial Hygienist (CIH) as site conditions warrant. The SHSS has stop work authority for safety conditions and evaluates and analyzes any potential safety problems, implements safety-related corrective actions, and maintains a daily safety log.

Project Quality Control Manager

The Project Quality Control (QC) Manager, Anthony Crino, is responsible for implementing the *Project Contractor Quality Control (CQC) Plan* (FWENC, 2001).

UXO Quality Control Representative

This individual will be UXO qualified and have completed the U. S. Army Corps of Engineers (USACE) Contractor Quality Management course of instruction, report to the Project QC Manager and will be responsible for the field execution of the Project CQC Plan. This individual will have stop work authority. This individual will also perform the duties of the SHSS.

UXO Supervisor

The UXO Supervisor, James Cocchiola, is responsible for the field work assigned to his team. He reports directly to the SUXOS Supervisor.

UXO Specialist

The UXO Specialist performs on-site duties including locating UXO, equipment operation, UXO safety, excavation, and escort duties as required. The UXO Specialist reports to the SUXOS.

All personnel involved in demolition operations will become familiar with and follow the procedures outlined in this SOP and applicable references.

3.1 TRAINING REQUIREMENTS

All personnel assigned to the site investigation will attend a site-specific orientation. The purpose of this orientation will be to review site-specific and emergency response procedures. Orientation attendance sheets with attached training schedule will be used to document completion of each orientation session. The topics to be covered during the orientation are provided as follows:

- Introduction
- Operation overview
- SHSP review

- Review Focused RI Work Plan
- Review SHSP
- Review SOP
- Safety precautions
- Equipment training
- Quality assurance (QA)/QC training
- Emergency procedures
- Review of emergency response equipment
- Talk/walk through of emergency procedures
- Emergency drill

All personnel assigned to the project are responsible for reading and understanding the Focused RI Work Plan. After reading the Focused RI Work Plan, the Site Superintendent/SUXOS will sign and date the Field Supervisor Review Sheet found in Attachment 1, and all other site personnel will sign and date the Field Team Review Sheet found in Attachment 2. These sheets will be filed in project files.

4.0 OPERATIONAL CONSIDERATIONS

4.1 NOTIFICATION, SCHEDULING, AND COORDINATION

Coordination of all personnel involved in the IR Site 2 characterization will be vital to the safe conduct of site activities. The OEW characterization effort by FWENC will ensure that OEW-associated risks on IR Site 2 will not affect the proposed use of the site. Coordination activities will begin with a series of meetings with all involved parties and agencies to identify shared and individual responsibilities. The community will be informed of the project schedule and the expected impacts. The coordination, notification, and verification activities are outlined below:

- **Coordination Meeting**—Before OEW characterization and time-critical removal action operations are scheduled to begin, a coordination meeting will be conducted to address specific elements of planning and will involve representatives from the following organizations:
  - DON [RPM and Resident Officer in Charge of Construction (ROICC)]
  - Former NAS Caretaker/Environmental Compliance Manager (ECM)
  - U.S. Environmental Protection Agency (EPA)
  - Regional Water Quality Control Board (RWQCB)
  - Department of Toxic Substances Control (DTSC)
  - The City of Alameda
  - FWENC

- **Topics** will include:
  - Explosive handling and transportation
  - Required support services, fire, medical, security, and so forth
  - Notifications
  - Community impact
  - Daily hours of operation
  - Exclusion zone (EZ) procedures
  - Emergency procedures

- **Notifications**—The FWENC SUXOS will notify the appropriate personnel prior to scheduled characterization activities as far in advance as possible to facilitate timely coordination arrangements for establishing the EZ and closing required roads. The SUXOS will ensure that the following activities/agencies are informed of the planned field activities:
  - Alameda Hospital (510) 522-3700
  - Alameda Fire Department (510) 522-2423 (Dispatch)
  - Alameda Police Department (510) 522-2423
  - NAS Alameda (ECM) (510) 772-8832

- **Daily Verification**—Prior to beginning each day's activities, the FWENC Command Center will verify daily that the following activities have been performed:
  - Emergency response activities have been notified and are available
  - EZs have been set and evacuated as required

4.2 EQUIPMENT/MATERIAL REQUIREMENTS

The SUXOS will inspect health and safety equipment prior to commencing operations. Two equipment checklists will be used to ensure a proper load-out is accomplished before departing for investigative operations. A Daily Equipment Checklist is provided in Attachment 3, and a Daily Health and Safety Equipment Checklist is provided in Attachment 4. It is anticipated that all tasks will be performed in Level D PPE. The following publications are required to be on site:

- Approved RI Work Plan with this SOP
- Explosive ordnance disposal basic (EODB) 60A-1-1-4, *Protection of Personnel and Property* [Naval Explosive Ordnance Disposal (NAVEOD), 1990]
- EODB 60A-1-1-31, *General Information on Explosive Ordnance Disposal (EOD) Procedures* (NAVEOD, 1994)
- Naval Sea Systems Command (NAVSEA) OP5 Volume 1 (NAVSEA, 1997)

4.3 UXO/OEW IDENTIFICATION

The SUXOS will perform Explosive Ordnance Reconnaissance (EOR) procedures and assessment of all suspect UXO/OEW to determine conditions and potential hazards. If the UXO/OEW encountered is unsafe to move/transport, it will be detonated in place, if possible. The SUXOS will notify the Alameda ECM and the United States Air Force (USAF) EOD Detachment located on Travis Air Force Base (AFB) to dispose of all unsafe to move/transport items encountered during the field investigation. If the UXO/OEW is safe to move/transport, it will be transported to the magazine area for consolidation and shipment by FWENC UXO personnel.

4.4 EXPLOSIVES OR MUNITIONS EMERGENCY RESPONSE

If it is determined that encountered OEW is unsafe to move or transport and that it poses an immediate threat to human health, public safety, property or the environment, the USAF EOD Detachment from Travis AFB will be called to conduct an explosives or munitions emergency response (EMER) to control, mitigate, or eliminate the threat [40 Code of Federal Regulations (CFR), Part 260.10]. The following procedures will be used to coordinate the response:

- The SUXOS will establish an EZ of appropriate distance for the type and size of OEW encountered
- The site will be clearly marked with stakes and surveyor tape

- Gates to the site will be closed and barriers placed in front of them
- The SUXOS will contact the following personnel/agencies:
  - Alameda Hospital (510) 522-3700
  - Alameda Fire Department (510) 522-2423
  - Alameda Police Department (510) 522-2423
  - Alameda Point ECM (Doug Delong) (510) 772-8832
  - Travis AFB Command Post (707) 424-5517
  - Travis AFB EOD Detachment (707) 424-2040/3146
  - RPM (Rick Weissenborn) (619) 532-0952
  - Project Manager (Abid Loan) (949) 756-7514
  - Associate Project Manager (Lance Humphrey) (619) 471-3519
  - EPA (Anna-Marie Cook) (415) 744-2367
  - DTSC (Daniel Murphy) (510) 540-3772

FWENC UXO Technicians will assist the Alameda ECM and the USAF EOD Detachment as required.

4.5 HANDLING, TRANSPORTATION, AND STORAGE

All UXO/OEW declared safe to move will be consolidated in the grid found and transported to on-site storage magazines in adherence to all applicable federal and state regulations, licensing, standards, and protocols. It should be noted that safe-to-move does not always mean safe-to-transport. The SUXOS will make this determination.

4.5.1 Explosive Transport Vehicle

The explosive transport vehicle will be a pick-up truck (for example, Ford F-150) equipped with sandbags and wood boxes to prevent explosive items from coming into contact with spark producing materials. The vehicle shall be inspected prior to transporting any explosive ordnance items to ensure the following:

- Brakes are set and the wheels chocked while loading and unloading.
- The vehicle's engine is turned off during any loading or unloading process.
- Four appropriate Department of Transportation (DOT) warning placards are temporarily attached to the vehicle prior to any transport of explosive items.
- A cellular telephone and a two-way radio that are compatible with any escort vehicle that may be assigned during transport of explosives will be available.
- Emergency warning triangles, barricade tape, first aid kit, wheel chocks, general purpose tool kit, and tow chain are readily available.
- Two multipurpose, dry-chemical fire extinguishers or two Class IA-10BC fire extinguishers are in the vehicle.

- Sufficient sandbags are in place to chock the container in the vehicle bed.
- A fire resistant bed cover/tarpaulin is available to cover the explosive item after it has been secured within the truck bed.

4.5.2 Inspection and Certification

Each explosive item scheduled for transport to the magazine area shall be inspected, certified, and documented by the SUXOS as safe to transport.

4.5.3 Packaging

Explosive items will be placed within a wooden container. A typical container would be a rectangular box with rope-type grab handles. The container will be over-packed to a zero head space with No. 2 granulated all-purpose sand to prevent a single item from moving within the confines of the container. The sand is added to all sides, front, and bottom to act as a shock stabilizer, heat insulator, and friction eliminator. A minimum of 3 inches of sand will surround each item secured within the container. The container will then be hand-loaded into the truck bed. Sandbags will be placed around the sides to chock the wooden container in place and additional sandbags will be placed on top of the container to prevent movement of the container during transport.

4.5.4 UXO/OEW Storage

Recovered UXO/OEW that has been deemed safe to move and safe to transport will be transported to magazine M353 area for consolidation and temporary storage. The magazine will be certified for the storage of Class/Division 1.1 materials and it will be used for the storage of mixed compatibility materials. Physical separation within the magazine will be used for non-compatible items (that is, physical barriers will be constructed using sandbags to isolate the different compatibility groups recovered) and the material will be stowed on pallets. At no time will the rated explosive capacity of the magazine be exceeded. The magazines will be locked with Sargent & Greenleaf Model 833 high security padlocks that meet MIL-P-43607G specifications for high security key locking padlocks. The SUXOS will maintain custody of the keys. The fenced compound that encloses the magazines will also be padlocked and the two access gates that provide access to the magazine compound will be locked as well. Access to the area is restricted to Base Caretaker Personnel.

4.5.5 Inventory

An inventory of the recovered UXO/OEW will be maintained inside the storage magazines and at the on-site office trailer using the Ordnance Accountability Inventory found in Attachment 6. The inventory will be updated each time a recovered item is placed in a magazine or is removed from a magazine. The period of temporary storage for encountered OEW will be less than 90 days.

4.6 PACKAGING

Upon the completion of investigative activities at IR Site 2, if any OEW has been encountered, it will be packaged and manifested in accordance with applicable federal and state requirements, and shipped to NAVSEA Crane, Indiana, for final disposition. The following documentation is required for shipment:

- Section 1 of the Hazardous Waste Profile Sheet completed (with documentation used to establish composition of the waste)
- Land Disposal Restriction Certification completed
- Documentation establishing DOT Hazard classification, proper shipping name, and packaging requirements

Accredited and pre-approved subcontractors will be used for the packaging and shipping of the OEW. Amplifying information concerning the shipment of waste military munitions will be maintained by the SUXOS in project files maintained in the site trailer.

4.7 COMMUNICATIONS

Communications equipment consisting of cellular telephones and hand-held radios will be available for emergency communications with fire and medical support activities.

4.8 FIRE FIGHTING

- Do not fight any fires that involve explosives.
- Notify the Alameda Fire Department prior to conducting demolition operations and contact them immediately upon the discovery of a fire.
- Ensure that the fire fighting equipment listed on Attachment 4 (Daily Health and Safety Checklist) is loaded into the vehicles prior to departing for site activities.

4.9 EMERGENCY MEDICAL SUPPORT

The ambulances from Alameda Hospital or fire trucks from the Alameda Fire Department (located on the former NAS Alameda) will be the first responders for emergency medical support. They can be contacted by dialing 911. A complete first aid kit will be maintained on site and at least two UXO Technicians will be trained in CPR and first aid procedures.

4.10 FIRE SUPPORT

The Alameda Fire Department located on NAS Alameda will be notified (510-522-2423) prior to the daily operations. No attempt will be made to extinguish a fire involving explosives until the explosives have been consumed.

4.11 PERSONAL PROTECTIVE EQUIPMENT

All demolition operations will be conducted in Level "D" PPE with safety glasses.

4.12 RECORDKEEPING

If any OEW is encountered during the surface investigation, the first section of the UXO Acquisition and Accountability Log form found in Attachment 6 will be completed detailing the type and location of the OEW. The OEW will be photographed and the photograph attached to the form. When disposition of the OEW is accomplished, the form will be completed, either for transfer or destruction.

4.13 TWO-MAN RULE

The two-man rule is a concept of fail-safe, where two knowledgeable individuals perform potentially hazardous operations in which each is the safety backup and watch person for the other. The two-man rule shall apply whenever OEW is handled or transported.

4.14 OEW SCRAP

OEW scrap (shrapnel, fins, expended munitions) will be controlled and accounted for from discovery to disposal. Items identified as OEW scrap will be inspected, removed from the site, containerized, and kept in the OEW scrap storage area between Magazines M353 and 354 until it is shipped to an approved processing facility (recycler). All OEW scrap will be documented on the UXO Acquisition and Accountability Log (Attachment 5) and on the Ordnance Accountability Inventory (Attachment 6) when it is transferred to the storage area.

4.15 ENGINEERING CONTROLS

Engineering controls (tamping, wetting the soil, tarpaulin-tenting, and so forth) will be used to limit/control the spread of dust and soil-borne contaminants (if present) and to control fragmentation during emergency blow-in-place (BIP) operations. The FWENC SUXOS and USAF EOD personnel will determine the type of controls that will be used based on the situation encountered. FWENC UXO Technicians will assist EOD personnel in the emplacement of those controls.

4.16 CONTINGENCY PLAN FOR LARGE OEW

Should large OEW be encountered that is unsafe to move, the EZ will be expanded and evacuated prior to conducting BIP procedures. The SUXOS will adjust the EZ as the situation dictates, but the size and type of OEW will generally determine the size of the EZ. For fragmenting explosive materials, the EZ will be established at 2,500 feet. For bombs and projectiles greater than 5 inches in caliber, the EZ will be expanded to 4,000 feet. If an OEW item is encountered that can be positively identified, the EZ for that item can be determined by using Table 13-2 in NAVSEA OP5 Volume 1 (NAVSEA, 1997).

If an evacuation of an EZ of 2,500 to 4,000 feet is required, the Alameda Fire and Police Departments will be notified and their assistance requested in conducting the evacuation. The following agencies/personnel will be notified if an evacuation is required:

- Alameda Hospital (510) 522-3700
- Alameda Fire Department (510) 522-24231(Police/Fire Dispatch)
- Alameda Police Department (510) 522-2423
- Alameda Point ECM (Doug Delong) (510) 772-8832
- Travis AFB Command Post (707) 424-5517
- Travis AFB EOD Detachment (707) 424-2040/3146
- RPM (Rick Weissenborn) (619) 532-0952
- EPA (Anna Marie-Cook) (415) 744-2367
- DTSC (Daniel Murphy) (510) 540-3772
- Project Manager (Abid Loan) (949) 756-7514
- Associate Project Manager (Lance Humphrey) (619) 471-3519

The Alameda Police/Fire Dispatch Office will coordinate all evacuation efforts and will contact other fire and police agencies as required. FWENC UXO personnel will assist the responding military EOD unit and the law enforcement agencies in preparing for the BIP operation and evacuating the EZ. The FWENC SUXOS and EOD Commander will brief the police department officials on the planned BIP procedures and activities will not commence until the Alameda Police Department Watch Commander has verified the evacuation of the EZ and given the EOD unit permission to proceed with the operation.

Engineering controls will be used to control fragmentation, if possible. The FWENC SUXOS and the EOD Commander will determine the type of control(s) used and FWENC UXO Technicians will assist EOD personnel in the emplacement of those controls.

5.0 QUALITY CONTROL

QC is performed to ensure that encountered OEW was transported and stored in accordance with applicable regulations and directives. The SUXOS, SHSS, and Project QC Manager will ensure that procedures are implemented as listed below:

- Certify UXO team conducting surface investigation operations in accordance with procedures described in the CQC plan.
- Conduct Surface Clearance Effectiveness Tests during investigative operations as prescribed in the Contractor Quality Control (CQC) Plan.
- Perform follow-up QC for on-site packaging, transportation, and storage.
- Complete data entry on the UXO Acquisition and Accountability Log (Attachment 5).
- Complete data entry on the Ordnance Accountability Inventory (Attachment 6).

6.0 GENERAL SAFETY PRECAUTIONS

This section provides the following general safety precautions for EOD operations:

- Know and observe federal, state, and local laws and regulations which apply to the transportation, storage, and usage of explosives.
- Do not permit metal, except approved metal truck bodies, to contact explosive containers.
- Do not transport metal, flammables, or corrosive substances with explosives.
- Do not allow smoking or the presence of unauthorized or unnecessary person, in vehicles containing explosives.
- Do not store explosives, fuse, or fuse lighters in a wet or damp place, or near oil, gasoline, cleaning solution or solvents, or near radiators, steam pipes, exhaust pipes, stoves, or other sources of heat.
- Do not store any sparking metal or sparking metal tools in an explosive magazine.
- Do not permit smoking, matches, or any source of fire or flame in or near an explosive magazine.
- Do not allow leaves, grass, brush, or debris to accumulate within 50 feet of an explosive magazine.
- Do not permit the discharge of firearms in the vicinity of an explosive magazine.
- Do not place OEW where they may be exposed to flame, excessive heat, sparks or impact.
- Do not expose OEW or devices containing OEW, to the direct rays of the sun. Such exposure increases sensitivity and deterioration.
- Ensure that OEW are returned to their proper containers and the containers are closed after use.
- Do not carry OEW or explosive components in pockets or elsewhere on the body.
- Do not insert anything but fuse or detonating cord into the open end of a blasting cap.
- Carefully load and unload OEW from vehicles. Never throw or drop OEW from the vehicle.
- Do not drive vehicles containing OEW through cities, towns, or villages, or park them near such places as restaurants, garages, and filling stations, unless absolutely necessary.
- Store OEW only in a magazine that is clean, dry, well ventilated, reasonably cool, properly located, substantially constructed, bullet and fire resistant, and securely locked.

- Ensure the EZ is clear of any unauthorized personnel before beginning investigative activities.
- Do not handle, use, or remain near OEW during the approach or progress of an electrical storm.
- Do not transmit on a radio within the Hazardous of Electromagnetic Radiation to Ordnance (HERO) distance of that radio. Do not turn on a cellular telephone within 10 feet of any OEW.

The two-man rule shall apply whenever OEW is handled or transported and during disposal operations on or off the range.

7.0 REFERENCES

Foster Wheeler Environmental Corporation (FWENC). 2001. *Draft Final Project Contractor Quality Control Plan, Visual Surface Characterization and Geotechnical and Seismic Evaluations at Installation Restoration Site 2. Alameda Point, Alameda, California.* San Diego, California.

Navy Explosive Ordnance Disposal (NAVEOD). 1990. *Explosive Ordnance Disposal Procedures, Protection of Personnel and Property.* (Publication 60A-1-1-4, Revision 2). Indian Head, Maryland: Naval Explosive Ordnance Disposal Technology Division.

NAVEOD. 1994. *Explosive Ordnance Disposal Procedures, General Information on EOD Disposal Procedures.* (Publication 60A-1-1-31). Indian Head, Maryland: Naval Explosive Ordnance Disposal Technology Division.

Naval Sea Systems Command (NAVSEA). 1997. *Ammunition and Explosives Ashore; Safety Regulations for Handling, Storing, Production, Renovation, and Shipping.* (NAVSEA OP5, Volume 1, Seventh Revision. Indian Head, Maryland: Naval Ordnance Center.

ATTACHMENT 1

FIELD SUPERVISOR REVIEW SHEET

ATTACHMENT 1

FIELD SUPERVISOR REVIEW SHEET

I have read the Project Work Plan and Standard Operating Procedure 1 (SOP-1) for OEW/UXO Disposal Disposition. I understand it. To the best of my knowledge the processes described in the Work Plan and this SOP-1 can be done in a safe, healthful, and environmentally sound manner. I have made sure all persons assigned to this process are qualified, have read and understand the requirements of the Work Plan and SOP-1, and have signed the worker's statement for this process. If necessary, I will conduct an annual review of the Work Plan and SOP-1. If deviations from this SOP-1 are necessary, I will ensure that project activities are stopped until the SOP-1 is revised and approved. If unexpected safety, health, or environmental hazards are found, I will ensure that project activities are stopped until the hazards have been eliminated.

SUPERVISOR'S NAME	SIGNATURE/DATE

ATTACHMENT 2

FIELD TEAM REVIEW SHEET

ATTACHMENT 2

FIELD TEAM REVIEW SHEET

Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read the Project Work Plan and Standard Operating Procedure 1 (SOP-1) for OEW/UXO Disposal Disposition and I have received the hazard control briefing. I understand them. I will follow the Work Plan and SOP-1, unless I identify a hazard not addressed in it or encounter an operation I do not understand. If that occurs, I will stop site activities and notify my immediate supervisor of the problem.

WORKER'S NAME	SIGNATURE/ DATE	SUPERVISOR'S NAME	SIGNATURE/ DATE

ATTACHMENT 3

DAILY
EQUIPMENT CHECKLIST

ATTACHMENT 3

DAILY EQUIPMENT CHECKLIST

Date: _____ **Disposal Supervisor:** _____

Equipment	Quantity	Comments
Explosive transport vehicle	3	
Personnel vehicle	1	
Camcorder/digital camera	1	
Air horn	4	
Bravo Flag (Red)	2	
Hand-held radios	2	
Ruler, 24-inch	1	
Schonstedt locator	1	
Shovel, round point, long handle	3	
Shovel, round point, short handle	1	
Tape, duct	6	
Tape, measuring, 50- or 100-meter	3	
Tape, plastic	6	
Toolbox, general hand tools	1	
Knife	1	

ATTACHMENT 4

DAILY HEALTH AND SAFETY EQUIPMENT CHECKLIST

ATTACHMENT 4

DAILY HEALTH AND SAFETY EQUIPMENT CHECKLIST
(As Required)

Date: _____ **Disposal Supervisor:** _____

Equipment	Quantity	Comments
Air horn, emergency	1	
Booties, rubber slip-on (1 pair per person)	1	
Burn gel	2	
Burn kit	1	
Compress, 18 x 36 inches	2	
Compress, 8 x 10 inches	2	
CPR kit	1	
Decontamination sprayer	2	
Emergency eye wash	1	
Eye wash, 15-minute	1	
Fire blanket	1	
Fire extinguisher, 10-pound	1	
First aid kit, 10-person	1	
Gauze pads, 3 x 3 inches	12	
Gloves, latex	12	
Gloves, leather	12	
Gloves, nitrile	5	
Goggles	5	
Hard hat	5	
Radios, hand-held	3	
Rain suit	5	
Safety vest	5	
Stretcher	1	
Tape	6	
Triangular bandages	6	
Voltage detector	1	
Water, 5-gallon bottle (emergency shower)	2	
Water, drinking 1 liter per person	6	

ATTACHMENT 5

UXO ACQUISITION AND ACCOUNTABILITY LOG

ATTACHMENT 5

UXO ACQUISITION AND ACCOUNTABILITY LOG

Delivery Order No.: _____ **Report No.:** _____

UXO TEAM: _____ **Date:** _____

ACQUISITION DATA

Grid Number	
Ordnance length (inches)	
Ordnance diameter (inches)	
Weight (lbs/oz)	
Ordnance type (bomb, rocket, projectile, hand grenade, mortar, rifle grenade, pyrotechnics, small arms, and so forth)	
Photo roll number/disk number	
Photo exposure number/digital file number	
Video marker – Start	
Video marker – Stop	
Ordnance description	

UXO DISPOSITION

SAFE HOLDING AREA	DATE	INITIAL	TRANSFERRED TO	DATE	SIGNATURE

DESTROYED BY	DATE	SIGNATURE

Comments: _____

_____

_____

Senior UXO Supervisor _____

ATTACHMENT 6

ORDNANCE ACCOUNTABILITY INVENTORY

ATTACHMENT 6

ORDNANCE ACCOUNTABILITY INVENTORY

Date: _____							
RPT #	**Item**	**Category***	**Found**	**Location**	**Initial Disposition**	**Photo #**	**Final Disposition /Date**

Notes:

* UXO – Unexploded ordnance – Ordnance fused, armed, or otherwise prepared for action and which has been fired or placed in such manner that constitutes a hazard.
AO – Abandoned ordnance – Ordnance which was disposed of by abandonment. The ordnance may or may not have been fused or armed, but was not employed as designed.
Inert – An item that has the same physical features of an ordnance item, but does not and never did contain energetic material.
OEW – Ordnance material that contained or was in contact with energetic material which has been expended.
RPT – Report